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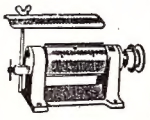

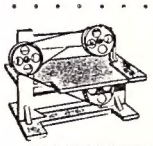

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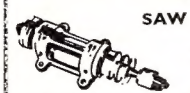

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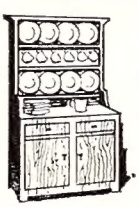

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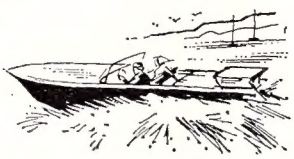

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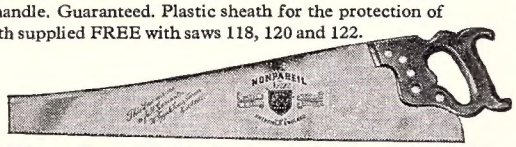

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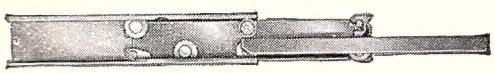

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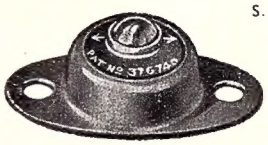

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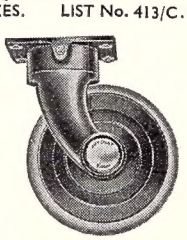

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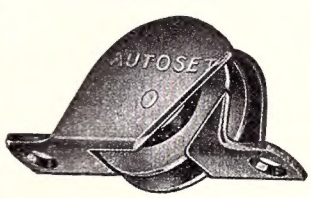

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WOODWORKER

VOLUME 66 NUMBER 824

JULY
1962

WRITING BUREAU

by MALCOLM J. HOGG, D.L.C.

The bureau described in this article was designed to eliminate any type of stay for the bureau fall. The resulting design is the author's answer to this and other problems posed by a piece of furniture of this type. The timber is Australian blackbean with cherry veneered fall front, sycamore being used for the interior fitment with oak for the drawer sides and bottoms to reduce wear.

THE TWO SIDES are cut from one piece to conserve timber as shown in Fig. 2, the sides and ends squared, but the curved edges left full until the final cleaning up. The bottoms of the curves are left horizontal, to assist in gluing in the bottom. The top and bottom are prepared, the front edge of the top being left $\frac{1}{8}$ in. full, and the four main joints of the carcase marked out. Lapped dovetails for the bottom and either double lap or mitre dovetails at the top. If the former is used then it is desirable that the fronts should be mitred. While marking out these joints it is necessary to make allowance for the fitting of the back, to ensure that the grooves containing the back panels coincide with the tails of the dovetail joints. The joints are now cut and fitted and the grooves worked.

The shelf on which the fall rests when in the open position is next prepared and the hollow section through which the back edge of the fall moves is worked, Fig. 4. A metal template should first be made from a full-size drawing and lines gauged on the shelf to indicate the extremities of the hollowing. Using a moulding plane the hollow is worked,

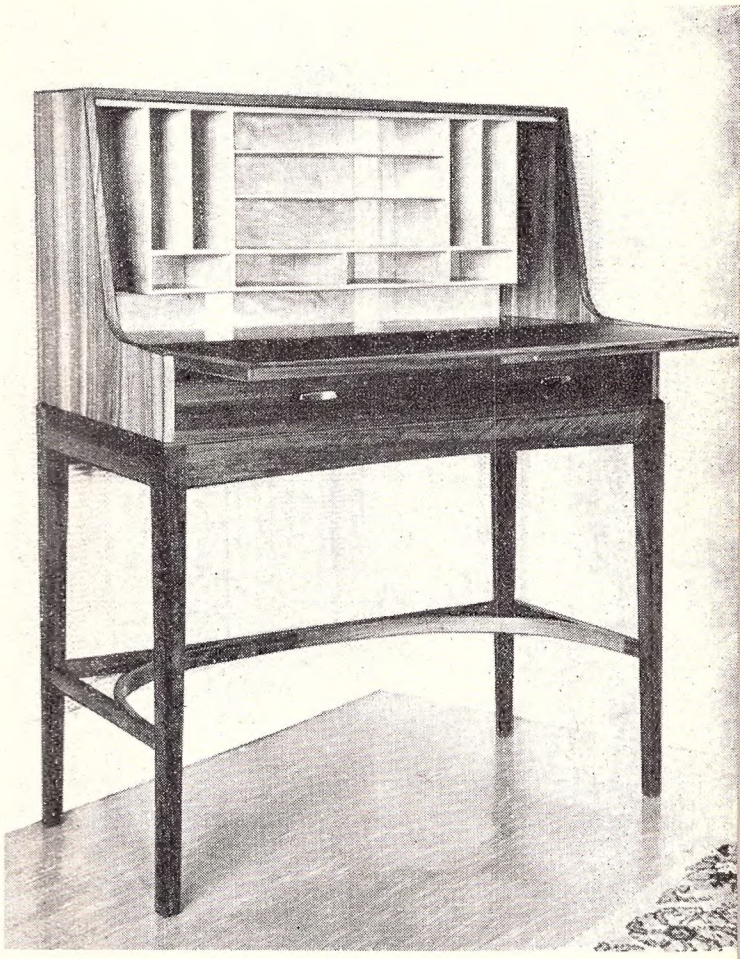
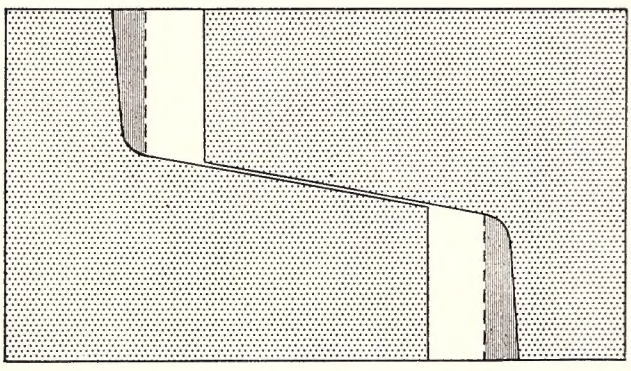


FIG. 1. THE ELEGANCE OF THE DESIGN IS WELL ILLUSTRATED IN THIS PHOTOGRAPH

FIG. 2 (below). TWO ENDS CUT FROM ONE PIECE
The heavily shaded parts are left on to assist in cramping carcase



checking with the template in conjunction with the gauge lines. At the same time the false bottom of the bureau interior should be prepared with the necessary bevel on its leading edge to accommodate the fall in the open position.

These two pieces are now marked out with a combination of stopped housing and stub-tenon joint to fit them to the carcase sides. The division of the drawer compartment should next be made and fitted. This also serving as drawer guides, it is essential that care is taken in its manufacture. The drawer guides consist, as shown in Fig. 4, of different length vertical supports at both front and back,

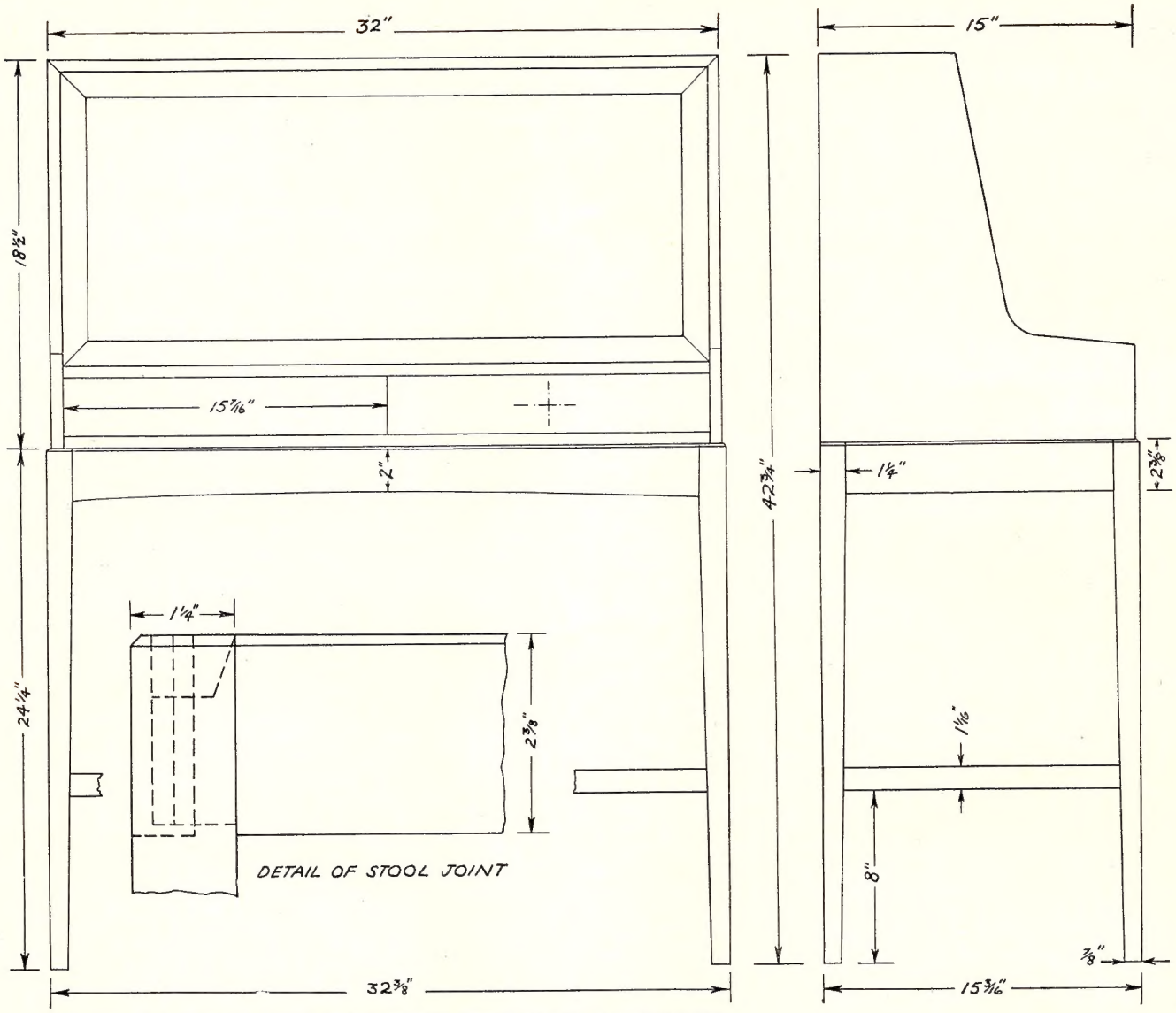


FIG. 3. FRONT AND SIDE ELEVATIONS WITH MAIN DIMENSIONS

and the runner which is tenoned into each of them, the whole being housed and stub-tenoned into the carcase bottom. The tenon of the runner into the front piece is glued but the tenon at the other end of the runner is left dry with a $\frac{1}{8}$ in. gap between the shoulders to allow for movement of the wide carcase bottom. It should also be pointed out that the division is set back from the front to allow for the overlapping drawer fronts.

The back

This consists of three panels and two muntins constructed so as to be flush on the inside, the grain direction of the panels being vertical. Allowance must be made on each panel for movement of the timber and a scratchstock moulding down each side serves to disguise the gap left for expansion, Fig. 5. No such allowance need, of course, be made in the length.

Great care should be taken throughout the construction of the carcase to ensure that all pieces are square and parallel to each other since the fitting and smooth action of the drawers depends on this being so.

Carcase assembly

All constructional work on the carcase is now complete and it can be cleaned up in readiness for polishing. The suggested finish is one of two or three coats of white polish to give a good surface for a finish of wax polish. Having ensured that all gluing surfaces are free of wax polish, assembly can begin, it being found considerably easier to glue in stages, shelves to sides, division to shelves, bottom to sides, finally dropping the muntins and panels in from the top and gluing the top in place. In this way each glued joint can be checked for perfect squareness, but at each stage top and bottom should be fitted dry to ensure overall squareness.

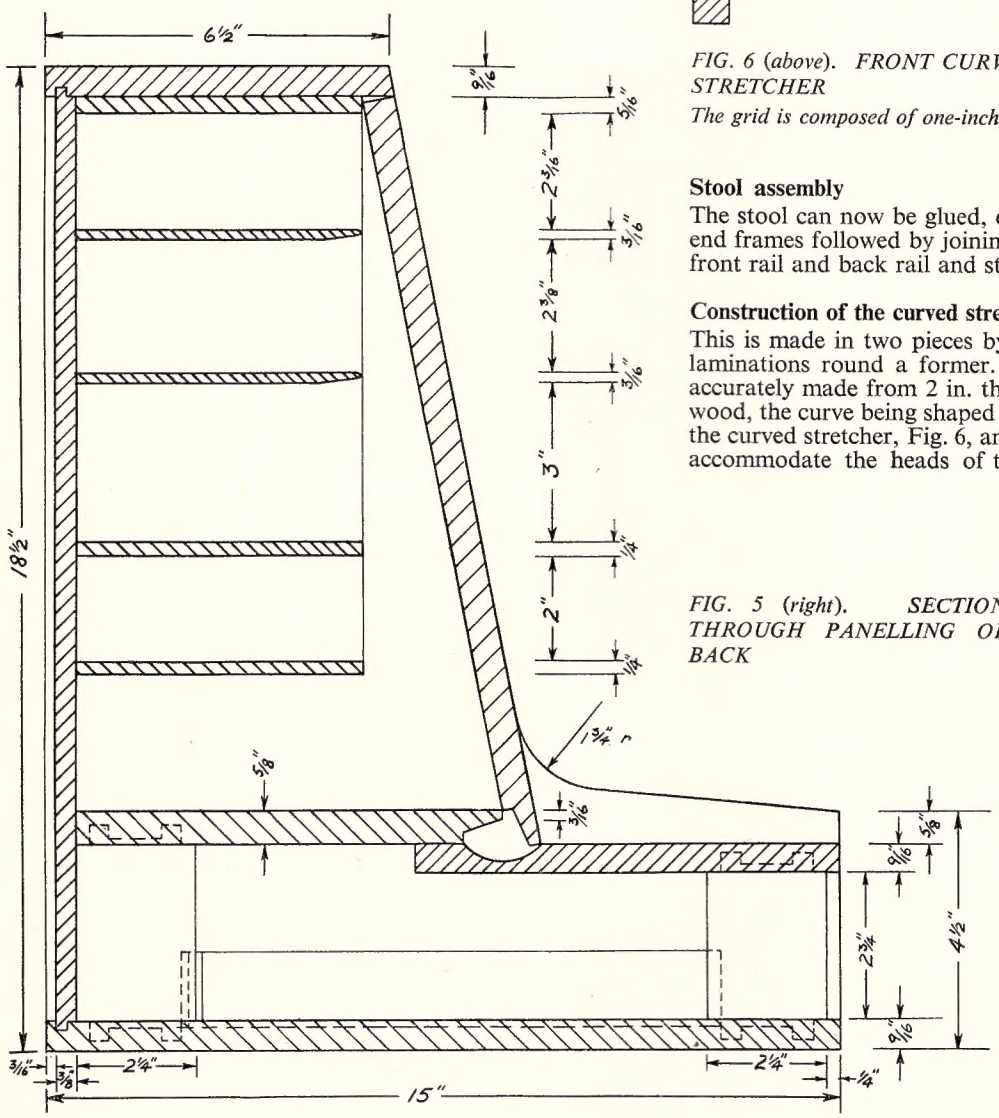
Stool construction

This is a perfectly straightforward construction with the

exception of the curved laminated stretcher which could be replaced by a straight member for the sake of simplicity. This, however, would detract a great deal from the appearance and would give considerably less strength.

The stool legs and rails are prepared and the joints marked out bearing in mind that the finished stool should stand proud of the carcase by $\frac{3}{16}$ in. at the front and each side. Marking out completed, the mortises can be chopped and the tenons cut, followed by the marking out and planing of the taper on the two insides of each leg, the taper commencing below the rails. The ends and back should now be considered as three separate frames and each should be cramped up dry and the stretcher for each G-cramped in position and the shoulder length scribed off. This procedure is necessary due to the tapering of the legs and this step should not, of course, be carried out until the tapering has been completed. The curve on the underside of the front rail can be worked and the mortises to receive the buttons, four on each side and two at each end, should be chopped prior to cleaning up and polishing.

FIG. 4. SECTION THROUGH BUREAU



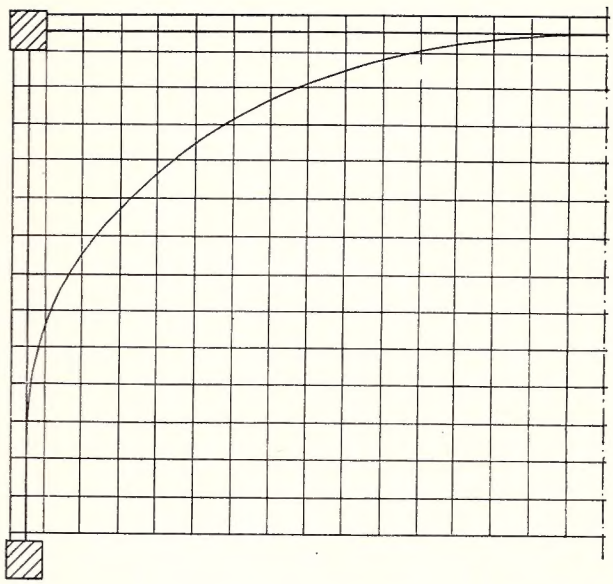


FIG. 6 (above). FRONT CURVE OF LAMINATED STRETCHER
The grid is composed of one-inch squares

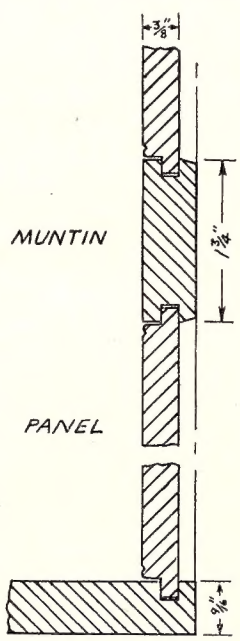
Stool assembly

The stool can now be glued, dealing first with each of the end frames followed by joining these frames by gluing the front rail and back rail and stretcher.

Construction of the curved stretcher

This is made in two pieces by cramping previously glued laminations round a former. The former must be very accurately made from 2 in. thick stuff preferably of hardwood, the curve being shaped to a full-size drawing of half the curved stretcher, Fig. 6, and holes cut in the former to accommodate the heads of the cramps. One side of the

FIG. 5 (right). SECTION THROUGH PANELLING OF BACK



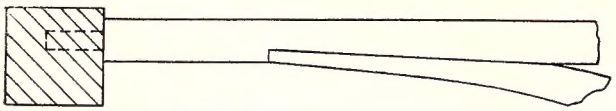


FIG. 7. SCARF JOINT FOR CURVED AND END STRETCHERS

former must be true and the curved face made perfectly square to this face otherwise a twist may result in the completed lamination. The lamination should be made about 2 in. longer at each end than the finished size, since there is always a tendency for the laminations to straighten out at the ends. The curved surface of the former is liberally coated with wax to prevent the laminations being held fast by any surplus glue. The laminations, sufficient to give a thickness equal to that of the other stretchers with an extra $\frac{1}{4}$ in. in width to allow for cleaning up after gluing, are toothed with a toothing plane prior to spreading the glue, and it is strongly urged that synthetic resin glue be used since the time involved in spreading the glue on each side of the laminations is considerable. The glued laminations are cramped to the former, with two dry laminations acting as packing. Start cramping at the centre and work out to the ends to eliminate any bulges and take care not to cramp too tight otherwise the completed stretcher will consist of a series of flats.

Fitting the curved stretcher

Perhaps the most difficult part now follows, namely that of holding the stretcher whilst planing it to size or almost to size, since it is preferable to leave it slightly full in width until fixed in position, when it is relatively easy to clean it off to match the other stretchers. The former can be used as a jig to hold the stretcher in the vice for planing. The type of scarf joint employed is indicated in Fig. 7, the flat on the stretcher being planed and the end stretchers of the stool sawn and chiselled to fit. The halves of the curved stretcher are fitted and glued in place one at a time and, of course, should be polished on each side first. Once the first half of the stretcher has set it is much easier to fit and glue the second with accuracy. Care should be taken to ensure that the front legs are the correct distance apart before finally gluing the curved stretcher in place. It only remains to finish the curved stretcher flush with the top and bottom of the side and back stretchers and polish the edges. (361-554)

(*To be continued next month*)

Cutting List

	Long ft.	in.	*Wide* in.	*Thick* in.
Carcase				
1 Top	2	9	$6\frac{3}{4}$	$\frac{9}{16}$
1 Bottom	2	$8\frac{1}{2}$	$15\frac{1}{2}$	$\frac{9}{16}$
2 Sides from one piece	2	4	$15\frac{1}{4}$	$\frac{9}{16}$
1 Shelf (interior)	2	$8\frac{1}{2}$	$8\frac{1}{4}$	$\frac{5}{8}$
1 Shelf (exterior)	2	8	$8\frac{1}{4}$	$\frac{9}{16}$
1 Drawer division (front)		4	$2\frac{1}{2}$	$\frac{9}{16}$
1 Drawer division (back)		$4\frac{1}{2}$	$2\frac{1}{2}$	$\frac{9}{16}$
1 Drawer runner		$10\frac{1}{2}$	$1\frac{5}{8}$	$\frac{9}{16}$
2 Muntins	1	$6\frac{1}{2}$	2	$\frac{9}{16}$
3 Back panels	1	$6\frac{1}{4}$	$9\frac{1}{2}$	$\frac{3}{8}$
Stool				
4 Legs	2	$1\frac{1}{4}$	$1\frac{1}{4}$ sq. nett	
2 Rails	2	$8\frac{1}{2}$	$2\frac{3}{4}$	$\frac{3}{4}$
2 Rails	1	$3\frac{1}{2}$	$2\frac{3}{4}$	$\frac{3}{4}$
2 Stretchers (side)	1	3	$1\frac{5}{16}$	$\frac{7}{16}$
1 Stretcher (back)	2	$8\frac{1}{2}$	$1\frac{5}{16}$	$\frac{7}{16}$
14 Laminations	2	4	$1\frac{3}{8}$	$\frac{1}{16}$
Drawers				
2 Fronts	1	$3\frac{3}{4}$	3	$\frac{1}{4}$
2 Fronts (false)	1	4	3	$\frac{5}{16}$
4 Sides	1	2	3	$\frac{1}{4}$
2 Backs	1	$3\frac{1}{2}$	$2\frac{1}{2}$	$\frac{1}{4}$
2 Bottoms	1	$2\frac{1}{2}$	$13\frac{1}{2}$	$\frac{1}{4}$
4 Slips	1	$1\frac{3}{4}$	$\frac{3}{4}$	$\frac{5}{16}$
Fall Front				
1 Panel (blockboard)	1	$0\frac{1}{4}$	$28\frac{1}{2}$	$\frac{5}{8}$
2 Sides	2	$7\frac{1}{4}$	$1\frac{1}{2}$	$\frac{5}{8}$
2 Ends	1	$2\frac{7}{8}$	$1\frac{1}{2}$	$\frac{5}{8}$
Interior Fitment				
1 Top	2	$7\frac{1}{4}$	$5\frac{1}{2}$	$\frac{5}{16}$
1 Bottom	2	$1\frac{1}{8}$	$5\frac{1}{2}$	$\frac{3}{16}$
2 Sides		$11\frac{1}{2}$	$5\frac{1}{2}$	$\frac{3}{16}$
1 Horizontal Division	2	1	$5\frac{1}{2}$	$\frac{3}{16}$
2 Vertical divisions		$9\frac{1}{8}$	$5\frac{1}{2}$	$\frac{3}{16}$
3 Vertical divisions		$2\frac{7}{8}$	$5\frac{1}{2}$	$\frac{3}{16}$
2 Horizontal divisions	1	$2\frac{7}{8}$	$5\frac{1}{2}$	$\frac{1}{8}$
2 Vertical divisions		$8\frac{3}{4}$	$5\frac{1}{2}$	$\frac{1}{8}$

Allowances have been made to lengths and widths. Thicknesses are nett.

CHIPS FROM THE CHISEL

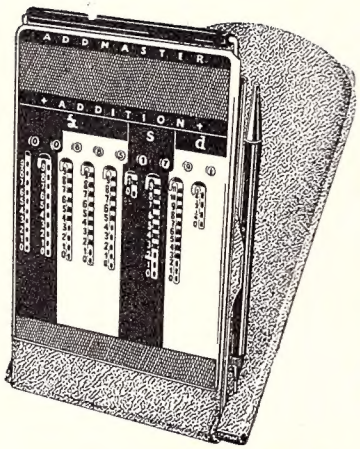
(*Continued from page 138*)

the reward. But life does not work out as simply as all that. It is precisely in the intermediate stages, when we are gaining so much in genuine, solid experience, that so much pleasure of a most satisfying, even thrilling kind, is obtained. What is more, there is the kind of natural growth which enriches the whole personality.

No manual skill in the world can keep pace with our quick, forward-leaping minds, which see the end in the beginning and so easily grow impatient at every small delay. To learn to hold one's mind on a curb so that it not only tolerates but enters fully and freely into every bit of detailed skill engaging the hands, makes a double pleasure. Nevertheless, the quicker the mind and the more vividly the imagination kindles at the thing we want to achieve, the more difficult it can be to endure the tedious patches. But we learn to acquire the necessary staying power until it becomes second nature, until indeed pleasure in our growing skill so highlights our days that we are carried over the dull parts as if on wings.

Or it may be the good moment comes to us like an unexpected, lovely little tune, like the little tune which slipped into Haydn's quartet in the midst of his processional concept of the universe, and piped up so sweetly that he fell in love with it himself and repeated it as if he could not bear to let it go, while his major themes waited. The moments that come to us in this way, unheralded and unrehearsed, are the best moments of all, for they come when our minds are set on the doing of a good work and we are doing it faithfully. (360)

FIGURES WITH EASE!



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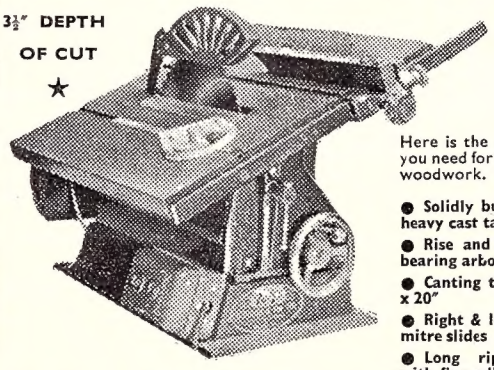

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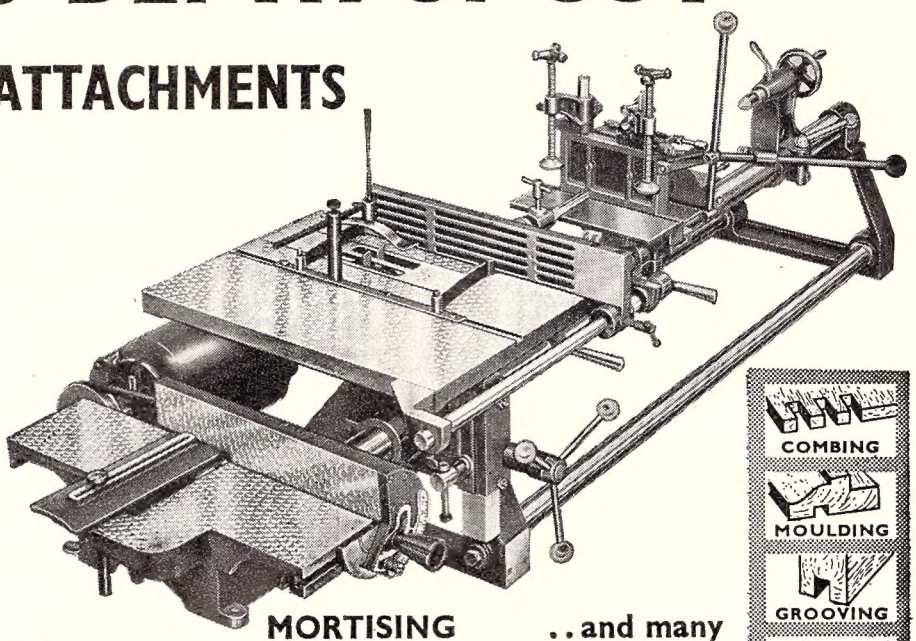

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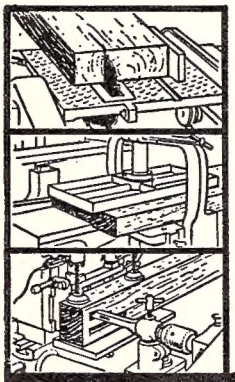

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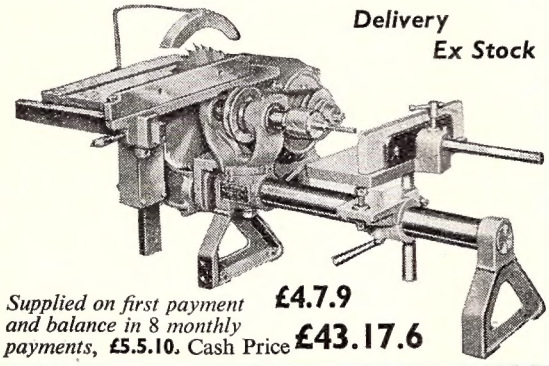

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WOOD CARVING

4. Heraldic lion

by WILLIAM WHEELER, A.R.C.A. (Lond.) Member of the Board of Studies, City & Guilds of London Art School.

Although the cuts are no deeper than $\frac{1}{8}$ in. the result is extremely effective. Modelling is little more than a sloping into the V cut outline, no attempt being made to round over the entire surface.

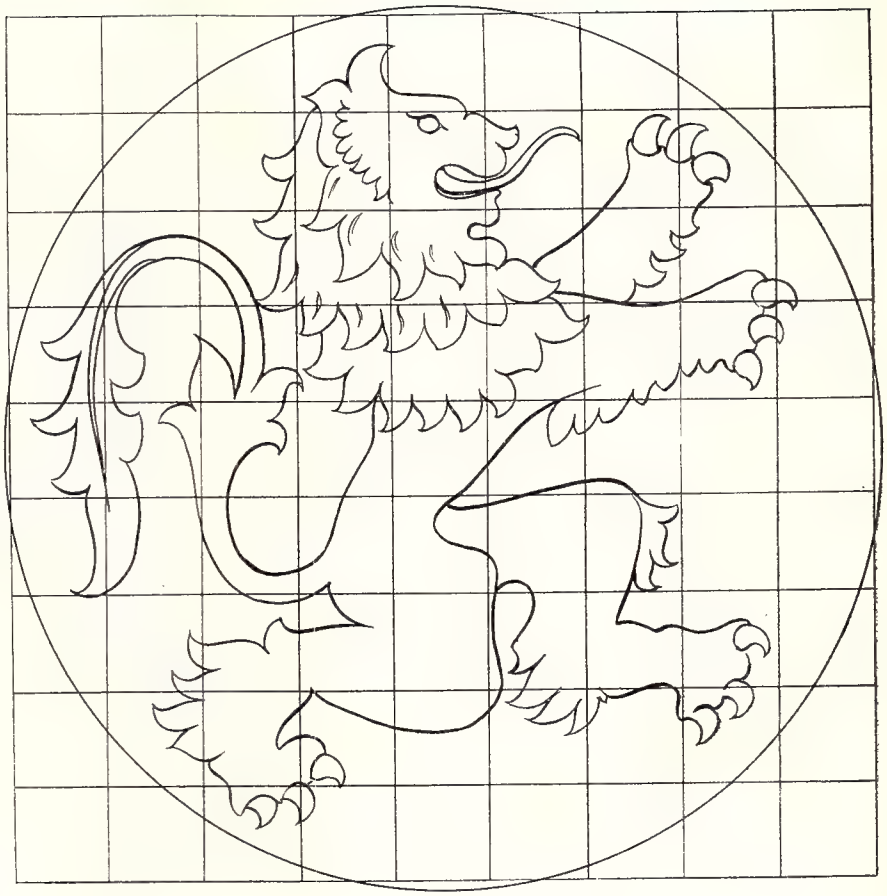


FIG. 1. THE DESIGN SET OUT IN 1 IN. SQUARES

There is no need to keep rigidly to this size. The squares could represent $\frac{7}{8}$ in. or $\frac{3}{4}$ in. if preferred

THE READER SHOULD by now have gained sufficient experience in the sharpening and handling of tools to tackle this heraldic lion (Fig. 2) with confidence, particularly if the suggestion of drawing and outlining with parting tools has been steadily practised. It should be emphasized that all the designs so far chosen have been exercises in a particular field of study, rather than completed works in themselves, and it is for the student to develop the ideas by making alternative designs.

As in the simple leaf form given in the May WOODWORKER the design is set out in squares for easy application, and transferred to the wood as already suggested. The material I think best suited to the design is oak, though the particular panel shown here is in mahogany.

FIG. 2. THE COMPLETED DESIGN

A sharp parting tool is essential for work of this kind. Careful control is necessary in following the outline

Using the parting tool

Having transferred the design to the wood, the first move is to outline the same with a parting tool. Do not let the angle of the tool be too acute, say about 60 deg. Now steadily go round the design, cutting at a depth of approximately $\frac{1}{8}$ in., no more; rather a little less if a choice has to be made. You will find that no difficulty is encountered if the tool is really sharp, except perhaps an occasional tearing up of the grain. This can be remedied by reversing the direction of the cut, and a clean outline will soon result. I find the design has a much more artistic and sculptural effect if the outline after cutting inclines slightly outwards rather than a definite right angle to the top surface. Undercutting never looks well in this form of carving.

You will have already found out that the parting tool cannot be manipulated into the smaller parts of the design, and no attempt should be made to use it. Go as far as possible and then follow on with stab or set-down lines, made by chisels and gouges that fit the shapes. This can be done with the aid of the mallet or the palm of the hand. Keep the same oblique cut made by the parting tool as in Fig. 3, then clear the waste wood away with,

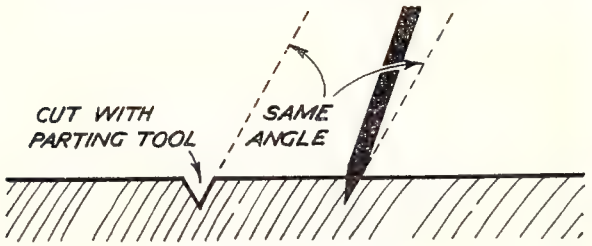


FIG. 3. ANGLE AT WHICH CHISEL IS HELD WHEN CUTTING IN SMALL DETAIL

say, a $\frac{1}{4}$ in. flat chisel, linking up with the parting tool cut. The result should be a uniform cut outline throughout.

Modelling

Now to the modelling. First it must be remembered the lion is purely decorative and is designed as such. Any modelling must therefore be done in a decorative way, rather than attempt to treat it naturalistically. Another point to remember in the modelling is that one must suggest the relief as a comparative basis; for example, two of the legs must give the impression of being in front of the other two, and the tail in the middle! To accomplish this you have only $\frac{1}{8}$ in. to play with. Apply this rule to all other forms in the design and you will soon understand how essential it is to model only with very flat gouges, say $\frac{1}{4}$ in. Nos. 3 and 4 and possibly No. 5.

Let all the cuts be considered first, then faintly draw them on the wood. Now cut freely with one of the gouges mentioned which you consider will give those subtle forms and shapes. Try not to merge these tool marks into the rest of the form. I know you will be tempted to do so. If it must be done with some cuts, then only the minimum.

The early Egyptians were masters of this treatment, and a book on their sculpture, of which there are many, or if possible a visit to the British Museum, will convince you that this form of carving has a wonderful quality.

Fig. 5 is another suggestion which you might like to try out. It is based on the Tudor rose, and, adapted to a piece of furniture, would look well as a repeating pattern. The cutting is treated in exactly the same way as that in Fig. 2. In a way it is a little more advanced as more setting in with gouges will be required to get round the outline. The top and bottom borders introduce a few tool cut patterns of the type given in the June number. So too are the cuts which form the serrations on the rose leaf. (362)

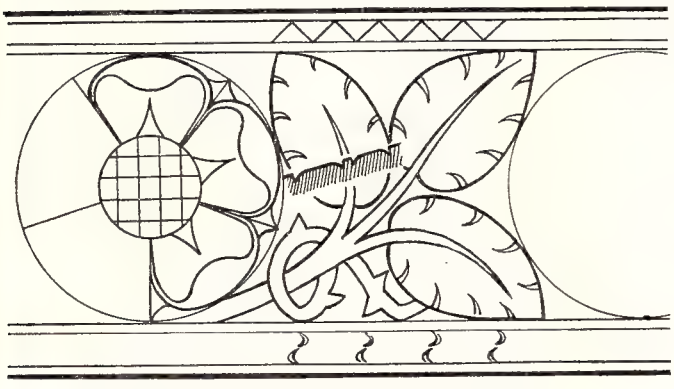


FIG. 5. TUDOR ROSE AND LEAF DESIGN

FIG. 4. THE DESIGN PARTLY CARVED

CAMERA TRIPOD

(*Continued from page* 139)

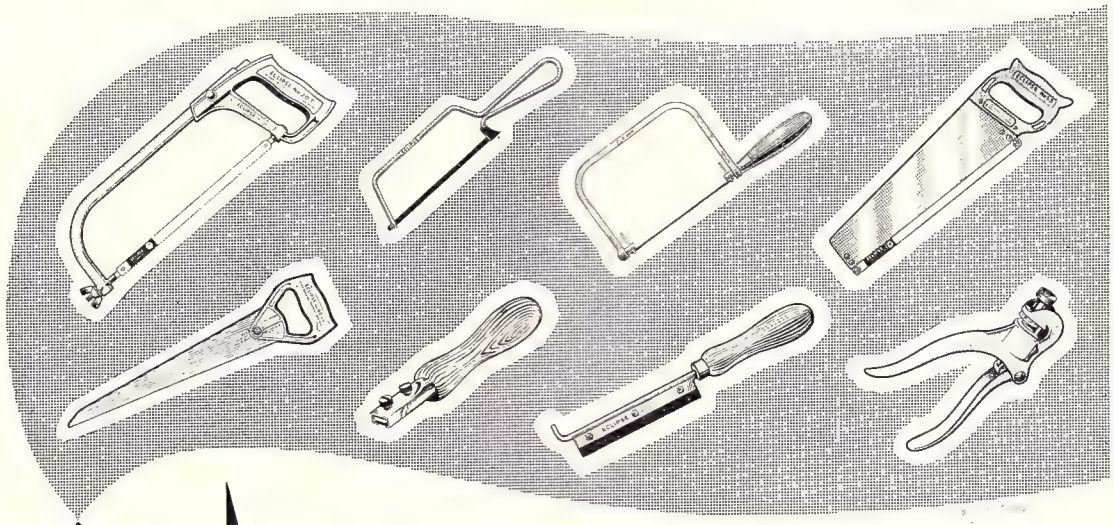
by 1 in. by $\frac{1}{2}$ in. clamping blocks at the top of the lower $\frac{1}{2}$ in. square centre legs are glued and cramped in place, afterwards when the glue has set they are drilled $\frac{5}{16}$ in. dia. centrally to take the clamping screws. A sawcut as shown in the drawing allows this leg to be clamped firmly to the outer legs at any height. These legs should be sanded to slide smoothly between the upper leg sections. The $1\frac{1}{2}$ in. by $\frac{5}{16}$ in. diameter clamping screws are fitted with knurled terminals or threaded knobs, $\frac{3}{4}$ in. diameter. Plastic furniture knobs were threaded to suit the screws of the tripod shown in the photograph, but $\frac{5}{16}$ in. wing nuts and washers should be used if threading facilities are not at hand. A $\frac{1}{2}$ in. diameter hard rubber toe is fitted on the bottom of each leg.

The tripod head is made from birch and is shown in detail in Fig. 3. It is first turned to $2\frac{3}{4}$ in. diameter, to the section shown, the three lugs marked out and the unwanted parts cut away. A $\frac{1}{2}$ in. diameter hole is first drilled $\frac{1}{8}$ in. deep in the top and then drilled through $\frac{9}{32}$ in. diameter to accommodate the camera clamping screw.

A $2\frac{1}{2}$ in. by $\frac{1}{4}$ in. diameter Whit. screw with a hexagonal head is used for the camera clamping screw. This screw carries a $\frac{3}{4}$ in. diameter threaded plastic knob or $\frac{1}{4}$ in. Whit. wing nut as shown in Fig. 3, the rubber washer holds the clamping screw captive in the head. (385-474)

Cutting List	*Long*	*Wide*	*Thick*
	ft. in.	*in.*	*in.*
3 Inside legs (mahogany) ..	2 8	$\frac{5}{8}$	$\frac{1}{2}$
6 Legs (mahogany)	2 8	$\frac{5}{8}$	$\frac{3}{8}$
12 Clamping blocks (mahogany)	$1\frac{1}{2}$	$1\frac{1}{8}$	$\frac{1}{4}$
1 Head (birch)	3	3	$\frac{7}{8}$

Allowances have been made to lengths and widths thicknesses are net.



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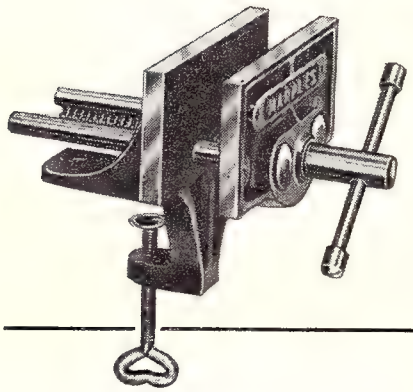

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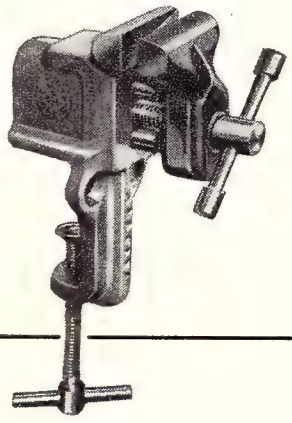

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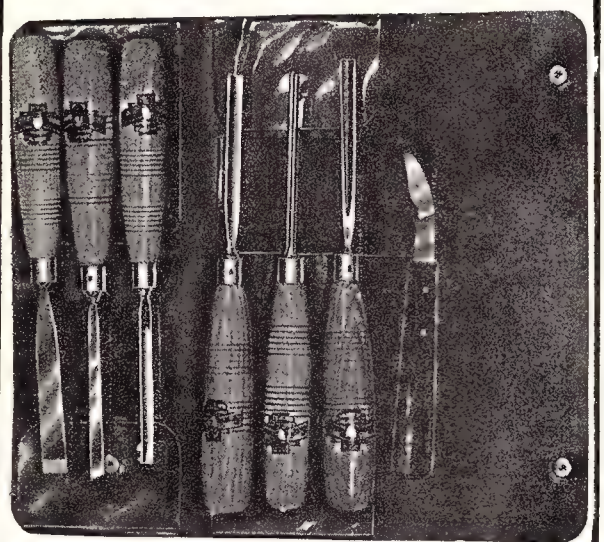

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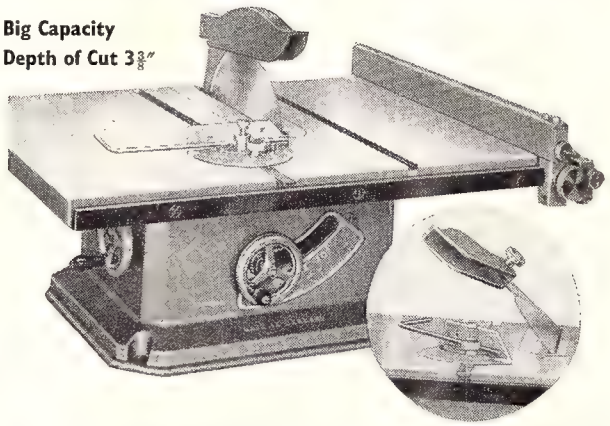

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POLISHING METHODS

3. Waxing

Waxing is a very simple finish for wood, but can look very well, particularly on oak.

ONE OF THE interesting things about this job of writing for the WOODWORKER is that one gets many letters from readers about their problems and difficulties in construction and finishing. Over the years these have come from places as far away as Canada and South Africa; from doctors in Harley Street and carpenters in Connemara. These letters are mutually helpful, for they give us an insight into the sorts of finishes which are popular, and one of these is the waxed finish. We should make it clear from the start that we would not regard this as a professional type finish. Nevertheless it can be just as attractive as any other to look at and has the great merit of simplicity.

Silicones

Like most finishing materials, wax polishes of the commercial variety have improved enormously in recent years. Now they are nearly all siliconized—that is, they contain a proportion—up to about 6%—of silicone in either fluid or resin form. Silicone is a synthetic material with peculiar properties, these being imparted to the wax in which it is incorporated. It gives a high degree of water repellency. On a vertical surface or slope, water will roll off without wetting the surface. On the level, beads will form which can be blown or wiped off without spreading. Silicone has the further important property of being incompatible with substances such as grease, milk, ink, dust, fruit juices, alcohol, etc. Stains from such materials cannot adhere to the surface. They can therefore be wiped off with a sponge or cloth, after which the surface gloss will reappear. Another quality is temperature stability, that is, the viscosity remains constant over a wide range of temperature.

The obvious question arises of how such a lone wolf material can be mixed with wax. The method is to use a solvent common to both the silicone and the wax. When the mixture is spread over an area the solvent evaporates rapidly. Naturally the wax and fluid become more concentrated. They will not stay together when the solvent has evaporated, as we have explained. As the wax hardens it forces the silicone to the surface where it forms a very thin film exhibiting the useful qualities we have mentioned, as well as giving a fine gloss with little effort.

Commercial waxes

The business of making such waxes is not nearly so simple as might be imagined. There may be up to nine or ten ingredients each serving a particular purpose. For example, a surface to be wax polished is rarely dry. There is almost certain to be a thin film of moisture on it condensed from the air. The old characters from whom we learned hand polishing always used warmed rags before waxing. To our youthful enquiries as to why, they explained that it gave better results—which of course it did—but it was a long time before the true reason dawned on us, namely, that the moisture reduced both the adhesion of the wax and the gloss achieved. In modern polishes there is an alcohol type ingredient which absorbs this damp film and removes it by evaporation. Also there are numerous waxes available but none of these is perfect for the job. They are too hard or too soft, so that a mixture to give the best density is usually required.

There are wax polishes made to suit all purposes, but the sorts we require are those made for furniture. They are intended for use over a varnish film. Sometimes they are emulsified and contain water which simultaneously washes the surface as the wax is applied. For wax polishing, the way we are discussing it, the solid types are the most suitable.

Some workers like to make their own waxes, but it will now be evident that these are unlikely to be as effective as the commercial variety. Nevertheless they will still give, on some jobs at least, a satisfactory finish. On oak in particular a good wax polish has a charm all its own. There are two waxes commonly available—carnauba and beeswax. Carnauba is very hard and beeswax rather soft. About 10% carnauba will give a suitable mixture. The waxes should be shredded as finely as possible with a chisel or knife and well mixed. If now covered with turpentine in a tin which can be sealed, the mixture will gradually dissolve. For quicker preparation the wax can be melted slowly over a gentle heat or in a tin placed in water in a glue pot. The turpentine or white spirit must also be heated by placing the container in very hot water and then pouring into the molten wax, which, of course, must be well away from the gas flame for safety, and the mixture stirred and allowed to cool.

Applying the finish

With plain wax at least we would consider a sealing coat essential, and indeed desirable for the other sort. This could be two or three successive thin coats of french polish, each flatted a day later with fine steel wool and the dust removed; or a sealing agent such as "Ronseal" similarly flatted. The sealer prevents penetration of the film by dirt or grease and reduces the time required for the work. The wax is best applied with a brush—a stiff clothes brush is about right—and worked in all directions across and along the grain. It is best left for a full day, by which time all the medium will have evaporated. The surface can then be well brushed in all directions with a finer brush, something like a boot polishing brush, and finally buffed along the grain only, with a rag. The test of a good job is to try to fingermark the surface. The only marks resulting should be vapour marks which will disappear quickly and completely. The best results are obtained when the film is built in this way with two or three thin coats. The solvents in silicone doped waxes will evaporate much more quickly. For sealed timber three thin coats are recommended. Each coat is allowed at least two hours—longer if possible—and then buffed with a rag. For bare timber a minimum of five coats are required, each allowed hardening time and then buffed.

There are not many mistakes one can make with wax polishing. There is practically nothing to it except elbow grease, the more of this the better. Any kind of stain may first be used, but a sealer is necessary after oil stains.

(353-534)

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SOLID ELECTRIC PLECTRUM GUITAR

by WILLIAM PRINCE

The second article of this series describes the construction of the body facings and fingerboard, together with the method used in calculating the fret positions.

FIG. 1. SHOWS THE DARK WOOD OF THE FINGERBOARD CONTRASTING WITH THE LIGHT COLOURED BODY FACING *(Photograph by the John F. White Studios, Ltd.)*

COMMERCIALLY MADE SOLID guitars are produced in many finishes ranging from plain hand-polished wood to glitter and other showy effects. Your choice of finish will decide the kind of wood to be used for the back and front of the instrument. The basic requirement in the material is that it must be fairly hard-wearing. If a coloured cellulose or similar finish is decided on, which will completely hide the wood, something plain like beech or birch would be ideal. I would always choose a decorative hardwood however, which, finished with varnish or french polish, makes a much nicer looking instrument and, I contend, is more in keeping with the production of music.

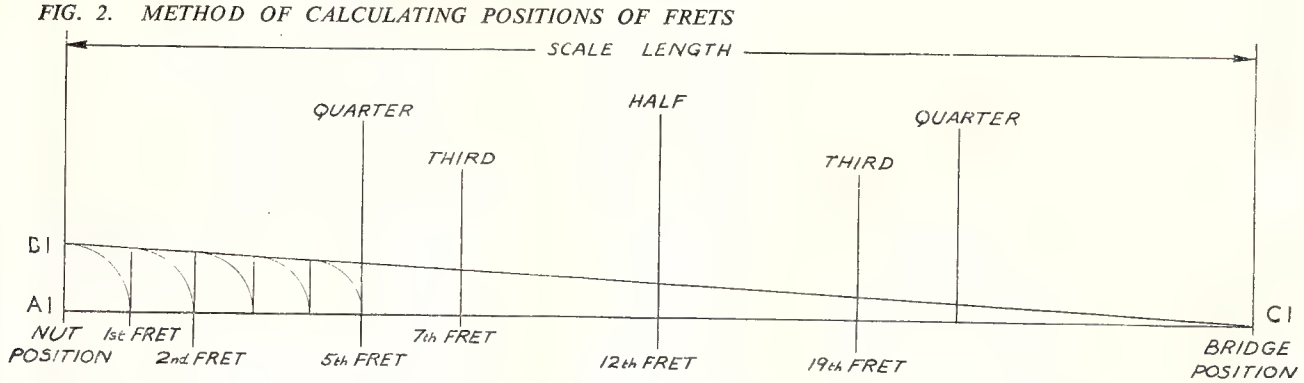
The rims of the body may be edged with a good hardwood, as I shall describe later. In this case the facing pieces can be of softer material such as parana pine, etc. and contrasting woods in this way can produce a most attractive appearance.

The back and front may be made either from single pieces of wood 13 in. wide, or each of two pieces with matching figure, joined together on the centre line of the guitar. If two pieces of figured sycamore, walnut, mahogany, etc. about 17½ in. by 7 in. by ¾ in. are obtained, they can be deep sawn and the sawn surfaces finished for the face of the wood. Next the centre-line edges are planed straight and square to join together with a glue such as Cascamite. When the glue is well set the pieces should be finished to ¼ in. thick, the sides to be glued to the body being trued.

Although the back and front pieces are not exactly alike in shape they should be cut and fitted so in the first place, certain adjustments coming later. If the rim of the body is to be bound with hardwood strips, the facing pieces must be cut exactly to shape ⅛ in. inside the finished body outline, which will leave a ¼ in. by ⅛ in. rebate on the edges when they are glued in place. Next cut out of the front piece a circular hole which corresponds with the circular rebate K (Fig. 2 June number) in the body of the instrument. Before applying the back and front pieces rough the inside surfaces (with a hacksaw blade) to give purchase for the glue. The assembly should be cramped up using battens across the work until the glue is set. In this operation care must be taken to avoid surplus glue being squeezed into the lead channel, M.

For the bound-edge construction four strips of hardwood some 26 in. by ¼ in. by ⅛ in. will be required. If the body generally is of light-coloured wood the strips could be of walnut, mahogany, rosewood, etc., and the contrast will

FIG. 2. METHOD OF CALCULATING POSITIONS OF FRETS



enhance the appearance of the instrument. In the same way beech or sycamore strips could be used on a darker-coloured body.

Before the rebated rims are finished the heel of the guitar neck will need to be shaped as shown in Fig. 3, so that the spine blends gently with the body shape. For this reason the back of the instrument is slightly undercut, as indicated by the dotted line in Fig. 2 June number. The heel only is shaped at this stage, the rest of the neck being left until later. Afterwards the back rebate may be extended as far as the junction of neck and body.

In order to curve the edging strips, a curved hot metal surface will be needed. A piece of copper or brass tube $1\frac{1}{2}$ in. to $2\frac{1}{2}$ in. diameter, with a gas-poker inside, makes a very good "bending-iron", but any cylindrically-shaped metal which can be safely and easily kept hot will serve.

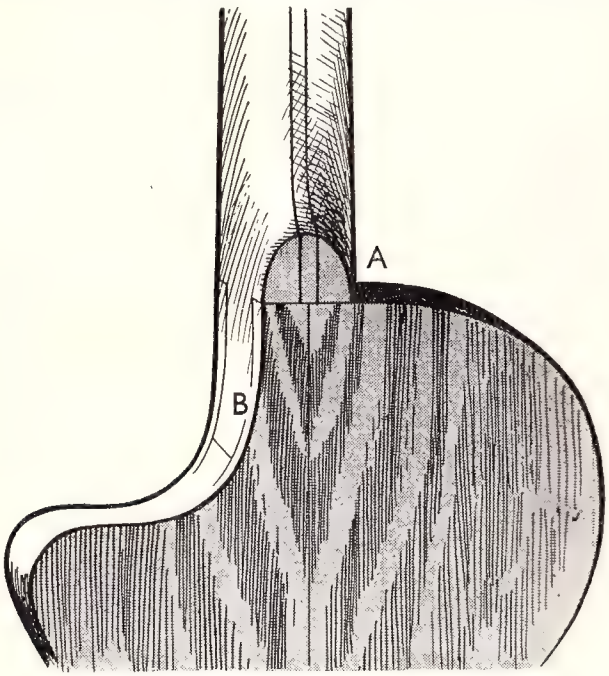


FIG. 3. SHOWING SHAPING OF THE HEEL OF NECK (A) AND UNDERCUT BACK PIECE (B)

The strips of wood are first of all soaked in water for about fifteen minutes and then bent on the "iron" by applying firm pressure until the desired shape is obtained. This should be accomplished by the time all the moisture has been dried out of the wood. The "iron" is ready when it "spits" if water is flicked onto it. When the strips have been bent and are quite dry they should be cut exactly to good fitting lengths and glued in place in the rebates. They should be bound in place with string until the glue sets.

It is a good thing to leave the final rounding of the body edges until the instrument is nearly complete.

The fingerboard

As the plectrum guitar is strung with steel wire it must have a fingerboard of hard-wearing material and the range of suitable woods is very limited. From a guitar-makers' merchant you should be able to obtain a piece of ebony or rosewood suitable for the purpose, and these woods are best for both durability and appearance. Some other woods could be used but most of them are too light coloured. As the fingerboard is in regular contact with the player's fingers it would very soon look shabby if it were made from other than dark wood. The sides of Australian apple crates are often made from a dark red eucalyptus wood and a selected piece from this source could make an excellent fingerboard. You will find it very hard to work but some varieties plane up an attractive pink colour which darkens with time to a deep red brown.

The frets

The fret positions are found mathematically and for this purpose you will need a large drawing-board, T square and cartridge paper. First of all take the scale length, that is, the distance between the string contact points at nut and bridge which in this case is 25 in., and divide it by 17.835. The answer is the distance from nut to 1st fret. To find the second fret position one would take the 1st fret to bridge measurement and divide again in the same way, and so on.

Having calculated the 1st fret position you can, without further mathematics, arrive at the other fret placings by following the method shown in Fig. 2. The scale length is marked off on a horizontal line and the nut position marked at right angles to it. Measure off the 1st fret position on the horizontal and, with compasses, describe an arc cutting the vertical line at B1, the radius of the arc being the distance from A1 to the first fret position and the centre of the arc at A1. A line is now drawn from B1 to the bridge position C1. A vertical must now be drawn at the first fret position to intersect line B1 C1. The length of this vertical is the radius of a new arc to cut the horizontal A1 C1 to give the second fret position. The positions of all the frets can be obtained in this way.

The 12th fret is exactly half-way between nut and bridge. The 5th fret is exactly one quarter of the scale and 7th and 19th divide it into thirds. The distance between any five frets is the same as the following seven frets, e.g., the distance from nut to 5th is the same as from 5th to 12th. The following table will help you to check all the fret positions:

Half-way	between	1st	fret	and	bridge	is the	13th	fret
,,	,,	1st	,,	,,	13th	,, ,,	6th	,,
,,	,,	2nd	,,	,,	bridge	,, ,,	14th	,,
,,	,,	2nd	,,	,,	14th	,, ,,	7th	,,
,,	,,	3rd	,,	,,	bridge	,, ,,	15th	,,
,,	,,	3rd	,,	,,	15th	,, ,,	8th	,,
,,	,,	4th	,,	,,	bridge	,, ,,	16th	,,
,,	,,	4th	,,	,,	16th	,, ,,	9th	,,
,,	,,	5th	,,	,,	bridge	,, ,,	17th	,,
,,	,,	5th	,,	,,	17th	,, ,,	10th	,,
,,	,,	6th	,,	,,	bridge	,, ,,	18th	,,
,,	,,	6th	,,	,,	18th	,, ,,	11th	,,
,,	,,	7th	,,	,,	bridge	,, ,,	19th	,,
,,	,,	7th	,,	,,	19th	,, ,,	12th	,,
,,	,,	8th	,,	,,	bridge	,, ,,	20th	,,

When the fingerboard material has been prepared straight and true its top surface should be curved across the width, so that the centre is about $\frac{1}{16}$ in. higher

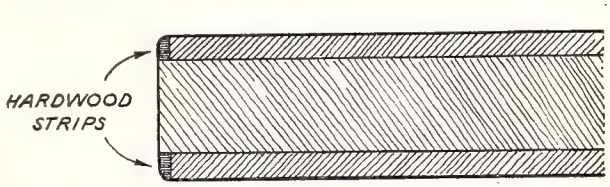


FIG. 4. HALF-SIZE DRAWING OF HARDWOOD EDGING STRIPS

(*Continued on page* 148)

THE LITTLE TUNES

I WELL REMEMBER many years ago declaring hotly that I thought this business of being young was awful. "No one wants to put you in charge of anything or treat you like a responsible person," I stormed. "What does it matter about experience if you can do the job?"

My senior replied with a twinkle in his eyes that it was a condition time would cure but, looking at him gloomily, I did not find it funny. One can feel very frustrated at nineteen. How endlessly the apprenticeship years, the qualifying years, seem to stretch out before one, with examinations to be passed, the mysterious thing, experience to be gained and all the time the urgency within one to reach the desired goal.

Today, more than ever, the position is intensified by the presence of two distinct rhythms in the world, the many mechanised, short-cut techniques which can be quickly acquired and which counterfeit skill, and the older, slower one of the person acquiring a mental or manual skill which needs time and experience to develop.

This slower movement is akin to the order of nature itself and sometimes I have wondered whether the instinct for craftsmanship is not something which goes a good deal deeper than the desire for practical achievement. There is something it seems to share with the powers of creation one sees at work in every facet of nature, from the very large to the very small, the same kind of hidden pulse governing its development.

First there comes the winter, not the end but the beginning of so much, when the soil is broken up and conditioned and cleansed in preparation for the impetuous creativeness of spring. The rush of new, enthusiastic life, the set-backs before the cold winds and arid patches of March, the alternating sun and shower and blossoming of April, in fact every kind of growth and impulse which every beginner in woodwork will have experienced at some time, and then the gradual development into maturity and the mellowness of autumn when powers have reached their final fruition.

And as the seasons work so does every phase of nature, the same kind of unfolding of growth and development, trial and error, in the same orderly rhythm. In the last quartet Haydn ever wrote there is a slow movement which always reminds me of this regular, inevitable, almost processional movement of creative life, as if the deep heart of the world were beating with heavy, sledge-hammer strokes, now and then becoming involved in small and exquisite variations as the living drama unfolds. It is as if we craftsmen were caught up in this same universal instinct, the processional march of all living creation, making our own contribution of the lovely things, the good and useful things it is in us to give.

That is why, I think, there are no short cuts to good craftsmanship. The recognised stages have to be worked through as skill builds up, and with each stage our hands become surer and our hopes mount higher. To try to skip leads only to disaster. And not only to disaster: it misses also much of the pleasure. That is the kind of mistake made by the snatch-and-grab and cosh bandits who, with their hearts set on money as a desirable end, think to cut out all hard-working intermediate stages and reap only

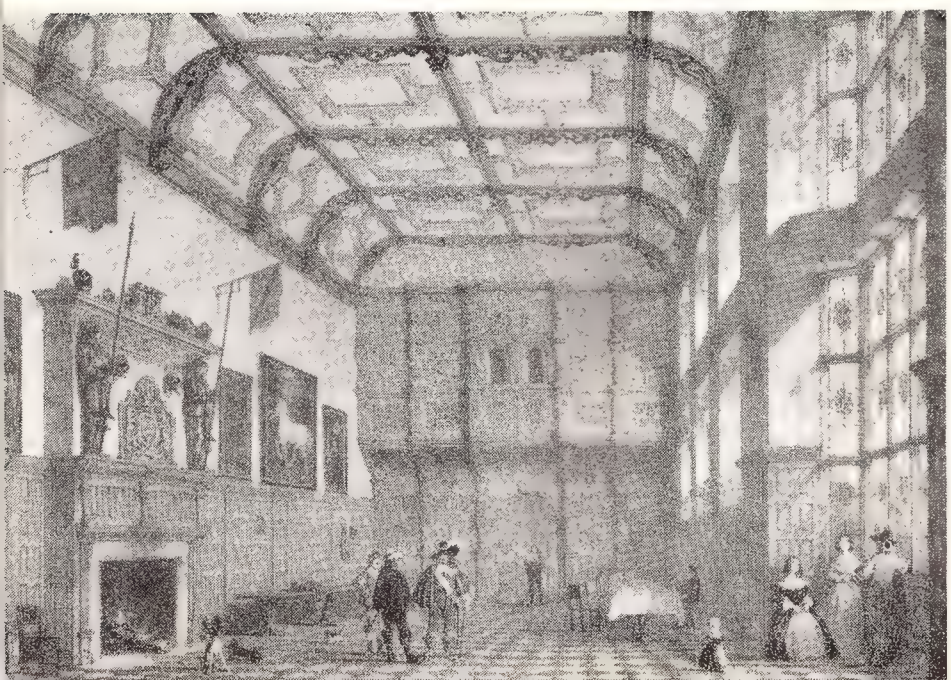
(*Continued on page* 132)

WHEN THERE WERE NO PHOTOGRAPHS

It calls for something of an effort to realise what the production of an illustrated book required before the days of photographs. To an extent it depended upon the subject, but the magnitude of the task must have been colossal when it came to portraying mansions and houses with their intricate detail and profusion of ornament. This, however, was what Joseph Nash undertook in the first half of the nineteenth century when he brought out his four books, "Mansions of England".

To compare his work with a present-day photograph is full of interest in that it reveals some of the changes that have taken place in one hundred and thirty years, and also in showing where Nash himself slipped up in his drawing.

This reproduction of the hall at Hatfield House shows what the place was like before the ceiling was painted by the Italian artist Taldini in 1878*; also before the walls were hung with the seventeenth-century tapestries which now cover the entire fireplace wall. The mantelpiece, too, shows that considerable alterations were made, the present one consisting of two great carved shell motifs, with the mantelshelf itself supported by caryatid figures. A feature that has not been altered, though the drawing shows a difference, is that, whereas Nash shows five rows of panels, there are in fact, six.*



Perhaps the chief note of interest in looking at these illustrations of old mansions is the difference in conditions prevailing then and now. In 1840 *nearly all these places were privately owned, and were staffed by what was almost a small army of servants. Today many of them have been sold and have become schools, hospitals, company headquarters, or are owned or conducted by the National Trust. Those still in private ownership have largely become show places and have been thrown open to the public.*

Two world wars have accelerated this change in social conditions. It is certain now that no individual ever could build a family mansion comparable with these old places, and even if he could he would never be able to staff it adequately. It is questionable, too, whether anyone would ever want to return to conditions of such inequality with all their strangely mixed disadvantages and virtues.

CAMERA TRIPOD

by J. A. LOGUE

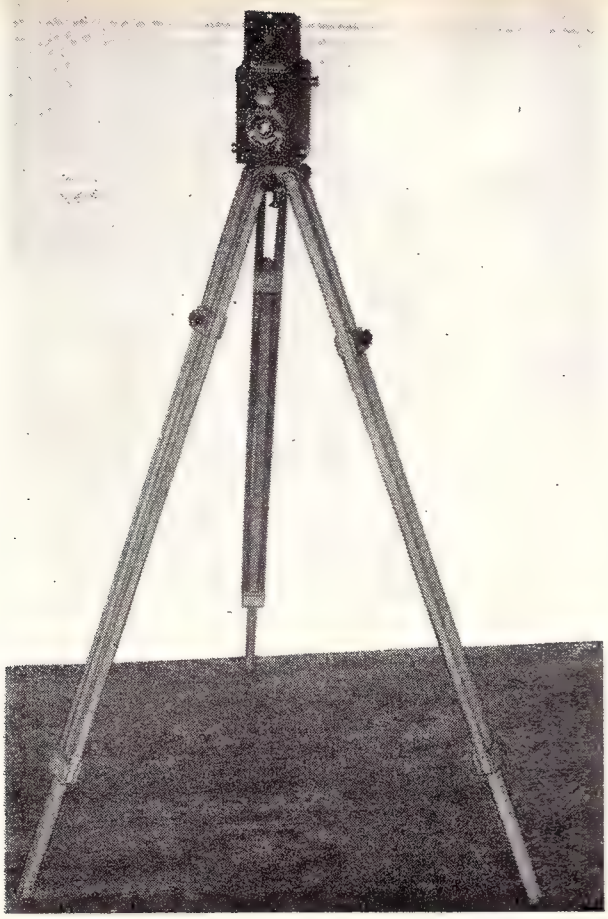


FIG. 1. A STABLE TRIPOD FOR TIME EXPOSURES

THE USE OF a camera tripod makes correctly composed pictures easy, allows for working with delayed action release and prevents camera shake. This sturdy adjustable tripod can be made very cheaply. The legs are 2 ft. 7 in. closed and 4 ft. 10 in. fully extended.

For the legs, well seasoned mahogany free from defects should be selected and the three legs made in two sections to the dimensions shown in Fig. 2. The $1\frac{1}{4}$ in. by 1 in. by $\frac{1}{4}$ in. blocks at the bottom of the upper leg section are glued and screwed in place leaving a $\frac{1}{2}$ in. gap between the legs; the tops of the legs are rounded as shown. The $1\frac{1}{4}$ in.

(*Continued on page* 134)

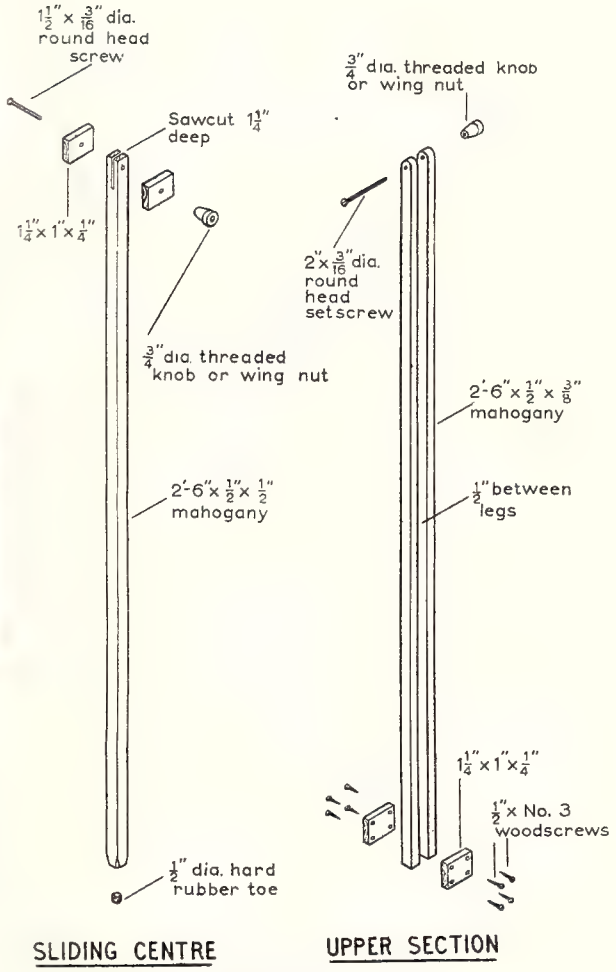
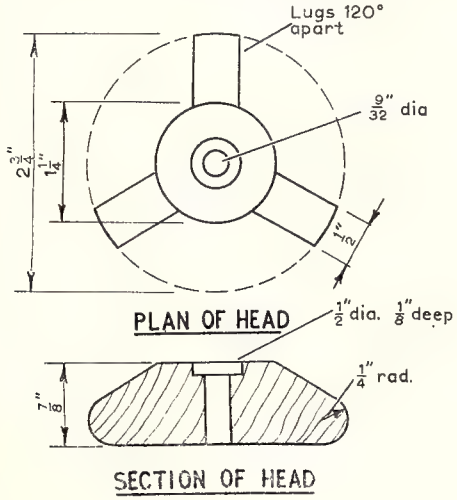
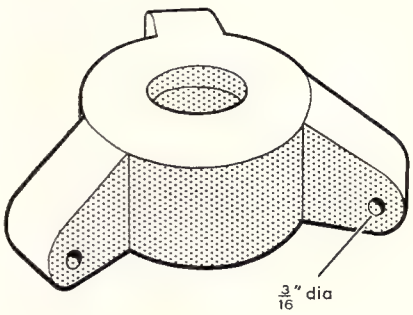
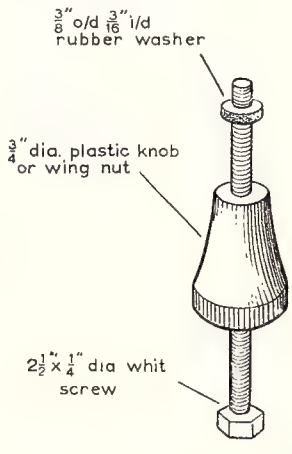

1½" x 3/16" dia. round head screw
Sawcut 1¼" deep
1¼" x 1" x ¼"
¾" dia threaded knob or wing nut
2'-6" x ½" x ½" mahogany
¾" dia. threaded knob or wing nut
2" x 3/16" dia. round head setscrew
2'-6" x ½" x 3/8" mahogany
½" between legs
1¼" x 1" x ¼"
½" x No. 3 woodscrews
½" dia. hard rubber toe
SLIDING CENTRE
UPPER SECTION

FIG. 2 (above). DIMENSIONS OF LEGS

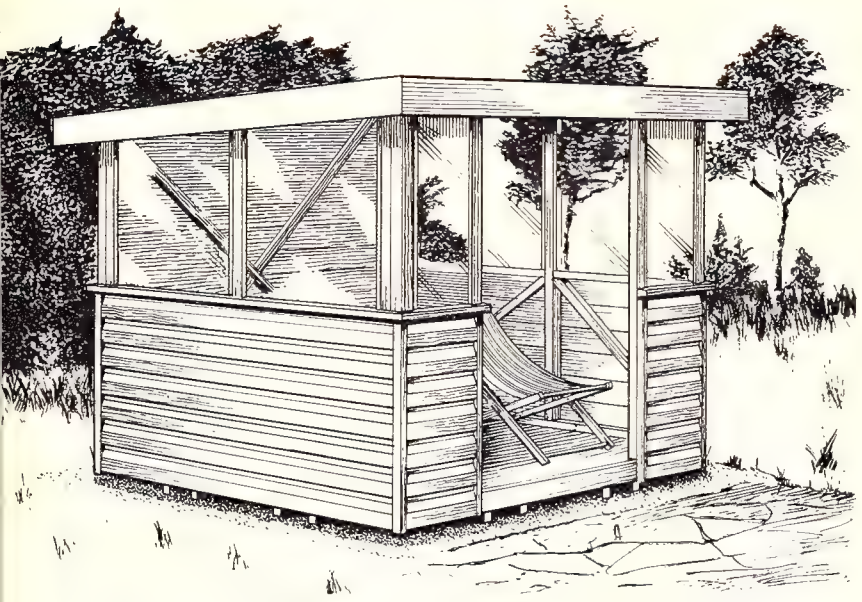
FIG. 3 (below). DETAILS OF TRIPOD HEAD







A



A REVOLVING SUMMER HOUSE

A summer house is most often used for leisure moments in the garden, but it is also a pleasant place in which to do some writing, or read a book. Good light is therefore important, and for this reason two opposite sides and the front of the house to be described are glazed. The design of the house is contemporary, and will therefore not look out of place in the garden of a modern home. Its construction involves no difficult work and is well within the scope of anyone of average skill.

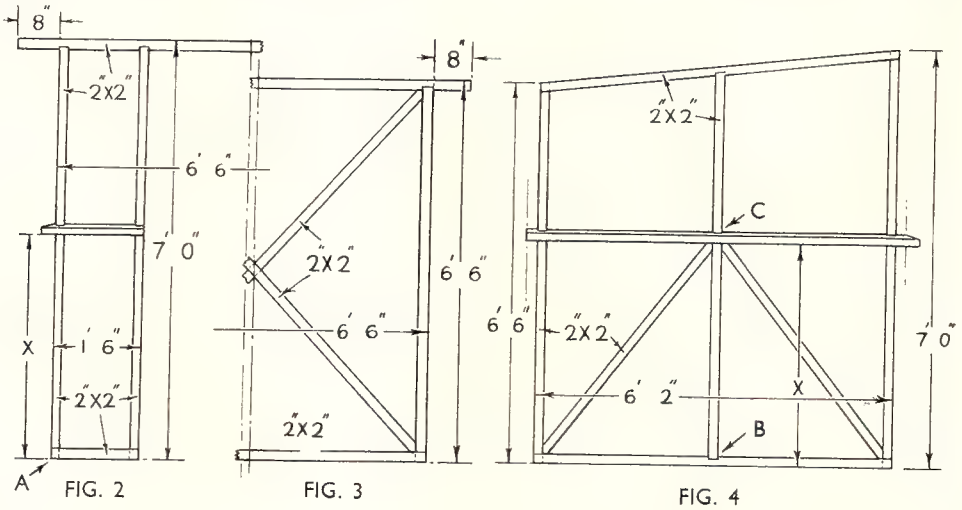
FIG. 1. CONTEMPORARY APPEARANCE OF SUMMER HOUSE

IT WILL BE found easiest to make up four separate frames and to bolt them together. Fig. 2 shows a half elevation of the front frame, Fig. 3 a half elevation of the back frame, and Fig. 4. an elevation of a complete side frame. If prepared stuff is used, allowances should be made since the nominal 2 in. by 2 in. members will probably only measure $1\frac{7}{8}$ in. square after planing. The angle joint at A is shown in Fig. 5, the other corner joints being similar. Open mortise and tenon joints are to be preferred but half laps could be used. The joints can be nailed together using oval nails for preference, or dowelled. The upright members are let into the horizontal members as shown in Fig. 6. This does not add materially to the rigidity of the frames, but by so doing, accurate positioning of the members can be made prior to nailing. Since the members are on the light side, probably $1\frac{7}{8}$ in. square,

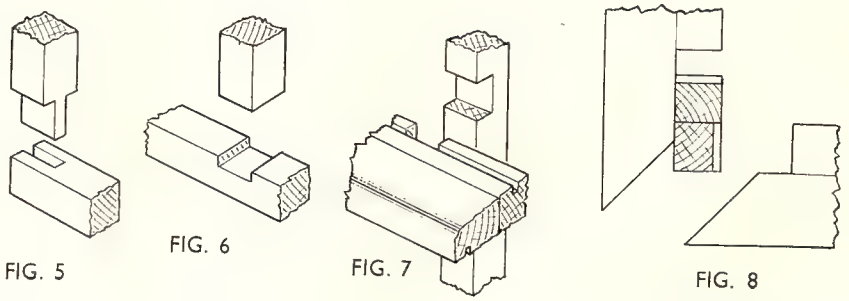
FIG. 2. HALF ELEVATION OF FRONT FRAME

FIG. 3. HALF ELEVATION OF BACK FRAME

FIG. 4. ELEVATION OF SIDE FRAME



FIGS. 5, 6, 7 and 8. DETAILS OF JOINTS AS MENTIONED IN THE TEXT



it is as well to cut in braces and to half lap them where they cross. The dimension X locating the sill will be dependent on the number of full width ship-lap boards it is proposed to use to clad the sides of the house. It will be seen from Fig. 9 that the bottom board on each side extends to the underside of the 4 in. by 2 in. framing of the floor, therefore this should be taken into account when deciding on the number of boards to be used.

It will be noted that the front and back frames abut against the side frames, therefore the width of each side frame is reduced by 4 in. The dimension 6 ft. 2 in. will consequently have to be increased if the stuff is only $1\frac{7}{8}$ in. square, that is, if the house is to be 6 ft. 6 in. square. The house should be square in plan, otherwise difficulty will be experienced in positioning the wheels for revolving the house. This will be understood on studying Fig. 10.

Sill

This projects more than usual in order to cast a shadow thereby enhancing the appearance of the house. It will simplify construction if 3 in. by 2 in. stuff is planted on 2 in. by 2 in. transoms stubbed into the side upright members of the front and side frames as indicated in Fig. 8. Half lap joints are used where the transoms of the side frames intersect the centre uprights as shown in Fig. 7.

The 3 in. by 2 in. should be ploughed on its underside to form a drip, the top surface being bevelled as shown in Fig. 9 in order to provide a weathering. It is as well to

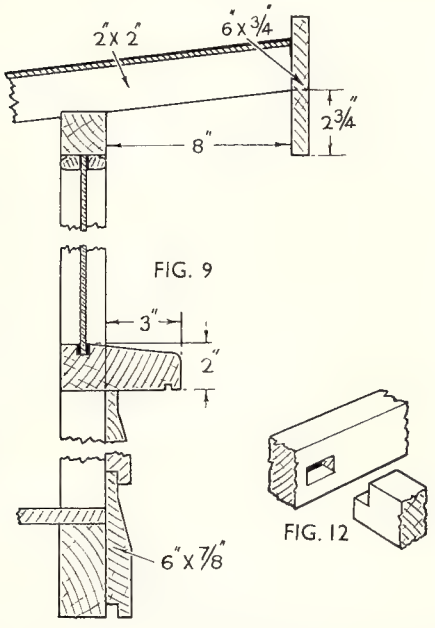


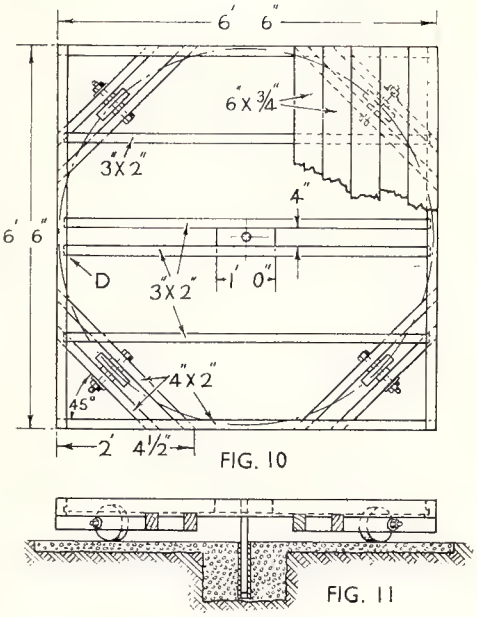
FIG. 9. OVERHANG OF ROOF RAFTERS WITH FASCIA BOARD AND DETAILS OF WINDOW SILL

FIG. 12. FLOOR JOIST STUB TENONED INTO FRAME

screw or nail the 3 in. by 2 in. on to the transoms after the frames have been assembled and fixed together since this will simplify mitreing at the angles.

Floor

It is essential that the outside surfaces of the frames should be flush with the outside faces of the 4 in. by 2 in. framing of the floor, as indicated in Fig. 9, otherwise



FIGS. 10 and 11. BASE OF HOUSE AND CONCRETE FOUNDATION

FIGS. 13 and 14. BATTENS AT CORNERS OF HOUSE
These cover the end grain of the ship-lap boarding

difficulty will arise in applying the ship-lap boarding. It will be noted that the tongues of the lowermost boards form drips. In order to make a good job, the ends of the joists should be stub tenoned into the frame as shown in Fig. 12. The joints at the angles of the frame can be open mortise and tenon or half-lap joints. Between the two central joists is a 4 in. by 3 in. block of wood which is fixed by nailing through the joists (Fig. 10). The block is bored centrally to provide a tight fit for a 1 ft. 6 in. length of 1 in. steel shafting which provides a pivot for the house.

The pairs of bearers mounting the wheels are arranged at 45 deg. It is suggested that 8 in. diameter wheels be used and the spacing of each pair of bearers should allow for the width of the wheel plus a washer on each side. It is advisable to let the bearers into the frame about $\frac{1}{4}$ in. since the slots for the bearers can be set out accurately and cut. This will assure the correct positioning of the bearers prior to nailing. Bolts of an appropriate length and having a diameter to suit the centre holes in the wheels will serve as axles for the wheels, the bolts being secured by nuts and washers. After the flooring has been nailed to the frame and joists, it is as well to make small holes in the flooring above the bearings of the axles so that these can be oiled from time to time.

Track for wheels

A circular wooden track laid on the ground and formed by segments has the advantage that it provides relatively quiet running for the wheels, but the segments are liable to rot in time and differ in level, consequently it may become difficult to turn the house. It is therefore suggested that a square area in excess of the diameter of the path of travel of the wheels should be concreted. The area is pegged out and excavated to a depth of about 4 in. and a hole, roughly 18 in. deep, is dug in the centre (Fig. 11). It is necessary to line the excavation by boards on edge,

which boards should be levelled since their upper edges support the screed when floating off the concrete. Before laying the concrete, a rod should be driven into the earth at the centre of the hole in order to mark the position of the tube which will receive the pivot of the house. The whole excavation is filled to within about 1 in. from the top with ¾-ballast and cement. On this foundation is laid a 4 to 1 mix of sand and cement which is carefully levelled by working the screed across. Before the concrete is set, the centre rod is removed and is replaced by a length of steel tube pressed into the concrete. The internal diameter of the tube should be such as to provide a running fit for the pivot pin of the house. Since it is important that the tube shall be plumb, it is well to temporarily insert a rod which extends sufficiently to allow a plumb rule to be placed against it for testing. The extent of the projection of the tube above the concrete should be such as to clear the block mounting the pivot pin.

Erecting the house

The front and rear frames are bolted or nailed through their lower horizontal members to the floor and are held in place temporarily by struts, the side frames being fixed in a similar manner. In addition to fixing to the floor, the frames are also bolted or nailed together through their corner uprights. If bolts are used, the heads should be recessed, otherwise they will obstruct the fitting of the ship-lap boards.

Fixing the boarding

If the sills have been carefully positioned according to the number and width of the boards to be used, no packing or ripping down of boards will be necessary. In order to obtain a neat finish at the corners of the house, 2 in. by 1 in. battens are nailed to the side uprights of the front and rear frames, against which battens the boards abut, as indicated in Fig. 13. Where the boards meet the uprights of the front frame, defining the opening of the house, they butt against 1 in. by 1 in. strips as shown in Fig. 14.

Roof construction

The rafters can be either 2 in. square stuff or 2 in. by 1 in. on edge. In order to make a close joint with the top members of the front and rear frames, the rafters should be notched as shown in Fig. 9. Each rafter should be of such a length that it overhangs the front and rear frames by 9 in. As will be seen from Fig. 15, the endmost rafters are flush with the ends of the projecting parts of the front and rear frames. When the rafters are nailed in place, a bevel is set to the angle of the one of the rafters with a face of one of the uprights of the front or rear frames. This will give the angle of cut for the ends of the rafters, so that the fascia boards, when fixed, will be parallel to the faces of the front and rear frames.

Marine plywood 9 m.m. thick provides a satisfactory covering for the roof, but rubberoid or tarred felt will have to be applied, as indicated in Fig. 15, in order to protect the plywood from the weather.

Glazing

The panes are fixed by beads nailed to the adjacent frame members, but the lower edges of the panes fit into plough grooves in the transoms as shown in Fig. 7. These grooves should, of course, be worked before the transoms are fixed. The panes will have to be tilted to permit their insertion into the grooves, therefore these will have to be of a width to allow for the tilting. When the panes are in place, the glass is sealed in the grooves by putty. The absence of beads on the sills gives a clear run away for water. (384-578)

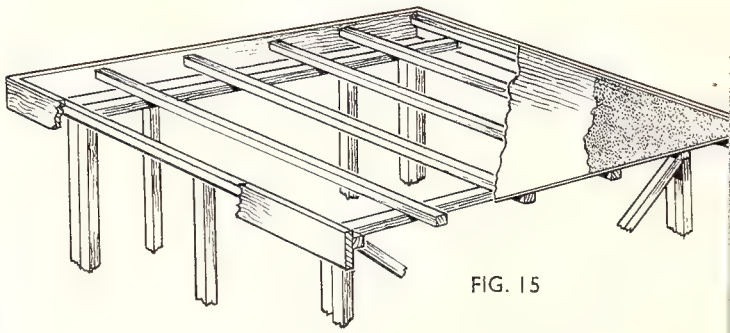


FIG. 15. ROOF CONSTRUCTION USING MARINE QUALITY PLYWOOD

Cutting List	*Long* ft. in.	*Wide* in.	*Thick* in.
Front Frame			
4 Uprights	7 2	2	2
1 Top member	8 0	2	2
2 Bottom members	1 8	2	2
2 Transoms	1 6	2	2
Rear Frame			
2 Uprights	6 8	2	2
1 Top member	8 0	2	2
1 Bottom member	6 8	2	2
2 Braces	8 6	2	2
Two side Frames			
2 Uprights	7 2	2	2
2 Uprights	6 8	2	2
2 Centre uprights	7 0	2	2
2 Top members	6 4	2	2
4 Braces	5 0	2	2
2 Transoms	6 4	2	2
Sills			
2 Front	2 0	3	2
2 Side	7 0	3	2
Floor			
Frame (4 sides)	28 0	4	2
4 Joists	6 9	3	2
4 Wheel bearers	3 9	4	2
4 Wheel bearers	2 9	4	2
Flooring (13 boards)	6 8	6	¾
Pivot block	1 0	4	3
Ship-lap boarding			
Front (14 boards)	1 7	6	⅞
2 Sides (14 boards)	6 3	6	⅞
Rear (13 boards)	6 7	6	⅞
Fascia Boards			
1 Front	8 0	6	¾
2 Sides	8 2	6	¾
Roof			
6 Rafters	7 6	2	2
Covering	60 sq. ft	9mm.	Ply
Beading	41 0	⅞	½

Allowance has been made for lengths, but widths and thicknesses are net. Nominal sizes are given for the 2 in. by 2 in., 4 in. by 2 in. and 3 in. by 2 in. stuff.

Fig. 1. "PICKING UP" AND MEASURING DIAMETER

BESOM MAKING

[*by J. GERAINT JENKINS*

THE VILLAGE OF Tadley on the Berkshire-Hampshire borders has been well known for many centuries as the home of a large number of woodland workers who draw on the heavy timber growth of the sandy heathland of the Aldermaston district to make a variety of products for farm, household, and industrial uses. One of the most famous of all the Tadley craftsmen is the broom squire or besom maker who has been well known in the village from at least medieval times. Although there are only two or three craftsmen still left in the traditional trade, whereas twenty years ago there were a dozen, a living can still be made from the making of the ordinary besom. Not only are besoms still required for the tasks of sweeping leaves and sports grounds, but they are still widely used in the modern steel industry for sweeping away impurities from newly made steel plates. In vinegar brewing, too, the bottoms of the vats are lined with handle-less besoms, known as swales, to a depth of some three feet. The birch used in besoms helps to create acetic acid and helps to filter the malt liquor. Despite its antiquity and simplicity the birch besom still has its place in twentieth-century Britain.

Materials

The raw material used in besom making is birch, usually winter cut. The broom squire generally buys standing birch by the acre, and, although in Northern Hampshire, countless generations of crafstmen have drawn on the timber of the sandy heathland, the hardy, rapidly growing birch trees are as profuse as ever. The material for besom making is selected from the crown of the tree; a tree that must be at least seven years old possessing a thick rounded crown.

After selection and cutting the birch is tied into large bundles and taken to the craftsman's yard. Here it is carefully piled into stacks which are often thatched and left for many months to season. The stacks, built in a special way, must be so piled that they are open enough to allow the winds to pass through, yet ensure that the rain and melting snow does not penetrate the heart of the stack and cause rot. The bundles of brushwood are carefully built up in layers laid lengthways and crossways alternately; each bundle head to tail with the next.

When the stack is some 14 ft. high, it is thatched with other bundles of birchwood, their heads pointing down at a sharp pitch in order to carry away all the rain. The birch is ready for use when the twigs are very hard, yet pliable and tough. In broom making, seasoning is of great importance, for should the timber be used too soon the finished besom would be brittle and of little use.

In addition to birch, the besom maker also requires a large number of handles. A great variety of woods may be used for handle making, although custom has dictated that the best brown handles are of ash, larch, or willow.

The only other raw material required is something with which to tie the heads, either galvanized wire or strips of willow, ash, cleft oak, or cane.

Head Making

The first process in head making is to open up one of the birch stacks and remove the bundles of birch. The bundles are opened and the birch selected and sorted according to size. Only the lighter twigs are suitable for broom making, the heavier branches being cut off and thrown away as are the very small twigs. The rejects are tied into bundles to be sold later as firewood. The birch for broom making is divided into two distinct groups—the first contains all the longer, rougher material for the core of the besom whilst the second pile contains the shorter, smoother material for the outside of the head. The sorted twigs are again tied into bundles ready for making the broom.

The main piece of equipment required by the craftsman is a home-made bench some 4 ft. long, known as a brown horse (see Fig. 2). He sits astride this, pressing a foot rest which clamps the binding wire to its jaws. Picking up a small handful of the longer birch twigs, the craftsman arranges them and adds to them a bunch of the shorter smoother twigs. When the craftsman's hands just touch as he grasps the bundle at the butt as in Fig. 1, he knows that he has the correct size, for the broom maker, working at great speed, never uses calipers or ruler.

With the bundle formed, the end of a galvanized wire is inserted into the bundle and twisted around it some four or five times. Locking the jaws of the horse, the wire is

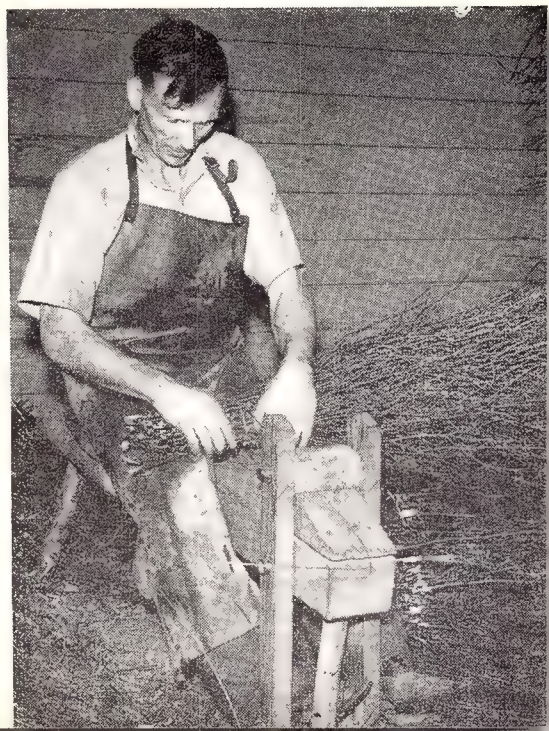


FIG. 2. TYING THE HEAD WITH WIRE

FIG. 3. TRIMMING HEAD WITH AXE

FIG. 4 (right). ASSEMBLING THE HANDLE

clamped and, leaning backwards, the craftsman draws it taut around the head (see Fig. 2). In some cases strips of cane, willow or oak may replace the galvanized wire. The process of tightening is the same, but in this case the binder has to be held in place with a small nail. Other binding materials that may be used are bramble, lime bark, or chestnut strips. With galvanized wire a second bond is tied on some 3 in. below the first for added strength. These are twisted and cut with a pair of pliers.

When the birch has been tied in this way, the besom head is placed on a chopping block and the butts of the broom cut away with a short handled axe (Fig. 3). The head is then complete.

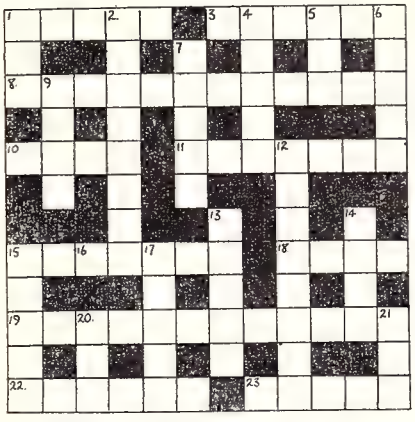
Handles

Seasoned ash, hazel, or willow sticks are placed in a shaving horse and the bark removed with a draw knife. The whole handle is then smoothed with a special type of plane which is known in Hampshire as a stail engine. This consists of two blocks of wood fastened together by two screws with a hole large enough to admit the handle in the centre. The tool is worked right down the length of the handle by a circular movement, so that the blade inside the hole shaves the handle to a smooth finish. Unlike the rake maker, the besom maker is not primarily concerned with the straightness of the handle; any piece of wood as long as it is smooth will suit his needs. The handle is then pointed with an axe.

All that now remains is to fit the handle to the broom head. It is inserted into the butt end of the head as in Fig. 4 and is driven right in. A nail is then hammered into the handle between the two bonds in order to keep the head in place. Sometimes too, a hole is bored through the head and handle and a wooden peg inserted in place of the nail.

This simple product, the besom, is of great antiquity and has been known in Britain from at least Saxon times, yet it is still unequalled for a number of tasks both on the farm and in modern industry. (357-444)

WOODWORKER CROSSWORD PUZZLE R/62011



Clues

Across

1. A walk along this piece of timber might lead to a big splash. (5)
3. Make a mark—in the wrong sort of way. (6)
8. Jack's big brothers? (6, 6)
10. They come out of spin to fasten light work. (4)
11. Talking is their business. (7)
15. Play chess, Ian? Don't know, but he has the material for some upholstery. (7)
18. Tree notorious for poisonous sap. (4)
19. Produces parallel lines with a pin. (7, 5)
22. Might describe a sort of rest. (6)
23. L-shaped piece of metal to fish. (5)

(*See solution on page* 146)

Down

1. Describes old-fashioned sawyer; sounds as if he's down the mine. (3)
2. They'll take a lot of punching. (4, 4),
4. A glum look is cheered up in this timber. (5)
5. University fellow with a Spanish title. (3)
6. Adjusts. (5)
7. Go, oil the upset ice-house. (5)
9. Might join two legs, perhaps. (4)
12. Keats' 'moss'd cottage trees' come under this heading. (2, 6)
13. Difficulties that might be in the form of pieces of timber in the river bed (5)
14. Jack London's was white. (4)
15. Their embellishment is often the woodworker's care. (5)
17. I dial, upset about Troy. (5)
20. Repent. (3)
21. Bathsheba was this sort of little lamb. (3)

HAND AND MACHINE TOOL SHARPENING

7. French spindle cutters

by GEORGE J. J. TURNER, A.I.M.Wood.T.

THE FRENCH SPINDLE, not so commonly used as in earlier years but still popular in some woodworking industries, has a number of advantages over other forms of spindle head.

1. The cutter steel can be rapidly ground to shape, and no loss of hardness will occur through overheating on the grinder.

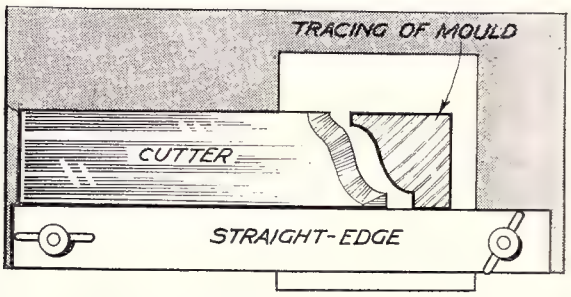


FIG. 1. TYPICAL CUTTER BOARD
When the cutter is offered up to the tracing the portions needing more grinding are obvious. Here more has to be removed from the top

2. The cutter forms the exact reverse of the shape it cuts on the timber, consequently there is no problem of profile development.
3. The steel used is, relatively, cheap.
4. Due to the particular cutting action, there is no tendency to tear out difficult grain.

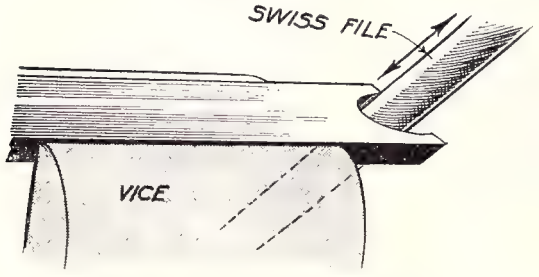


FIG. 3. FILING BEVEL WITH SWISS FILE

5. The diameter of the cutter track may be reduced to little more than that of the spindle, a great advantage on shaped work of small radius.
6. The cutter may be hardened and tempered when required, e.g. for a first class finish on woolly timbers.
7. The steel is easily filed so that small quirks or intricate mouldings present no grinding problem.

The french spindle is a unique cutterhead in woodworking machinery, operating with no cutting angle but with the edge of the cutter inclined towards the timber rather in the manner of a cabinet maker's scraper. Almost all the range of machine cutters and cutterheads have things in common, but the "Frenchman" stands alone. Even the cutter steel is unusual and not found on any other machine. For this reason, before we deal with the preparation of a cutter, we must understand the material.

Cutter steel

French cutter steel is a high-carbon tool steel of approximately 1·3% carbon content, and is supplied for use "normalised". It is delivered in convenient lengths and in $\frac{3}{16}$ in. or $\frac{1}{4}$ in. thicknesses of any desired width up to the maximum capacity of the spindle slot. When steel is normalised it is heated to a bright red and allowed to cool in still air. It will then have no brittleness or temper and all stresses will have been relieved, obviously the ideal material to withstand high impact without fracture and yet, due to its high carbon content, to have sufficient hardness to hold a cutting edge.

When preparing a typical cutter the first thing to decide is the length of steel required. Assuming that a moulding is to be worked $\frac{3}{4}$ in. on to the timber, that a $\frac{5}{16}$ in. face board is to be used, and $\frac{1}{8}$ in. clearance allowed between the $1\frac{1}{2}$ in. diameter spindle and the faceboard, it will be seen that the cutter is required to project $1\frac{3}{16}$ in. from the spindle. Add the diameter of the spindle and a similar

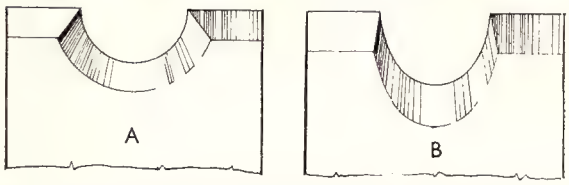


FIG. 2. DIFFERENCE IN GRINDING OF CUTTERS
A. Cutter for french head. B. For square block

balance projection on the offside, and we arrive at a cutter length of $3\frac{7}{8}$ in. A little will be lost in grinding, giving slightly less projection on the balance side. When cutting the steel to length it is necessary only to hacksaw a cut $\frac{1}{16}$ in. deep on each face of the steel when it may readily be snapped off in the jaws of a vice.

Grinding

Next the cutter must be ground to shape and here we meet one of the disadvantages of this cutterhead. It is most important to grind the profile relative to the bottom edge

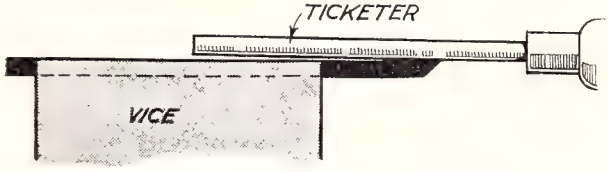


FIG. 4. BURNISHING FACE EDGE OF CUTTER
The tool is known variously as the ticketer or burnisher

of the cutter, as on the french head the tool cannot be tilted for adjustment. It is true that spindle moulders are in use fitted with canting heads, but such machines are

rare. A handy device to assist accuracy is the cutterboard illustrated in Fig. 1. A tracing of the moulding to be produced is mounted firm and square between the backboard and the straight-edge. The cutter is held against the

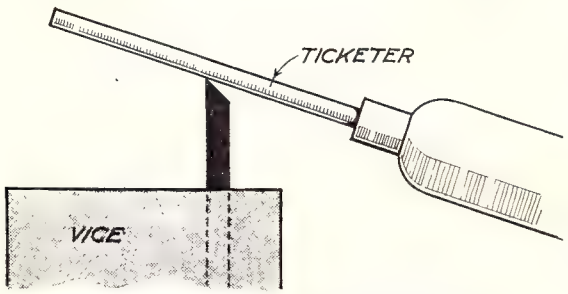


FIG. 5. BURNISHING AND LAYING-OVER THE CUTTING EDGE

straight-edge and offered up to the tracing, enabling both shape and squareness to be checked. The normal method of machining timber on the spindle is to set the cutter below the timber and, bearing in mind that a cutter is not reversible, we must be clear at this stage as to which hand we are to grind.

The grinding angle on french cutters is somewhat steeper than on other tools. For clean softwood 45 deg. is suitable, but for hardwoods it is necessary to increase the grinding angle to 60 to 70 deg. The greater the grinding angle the more difficult it is to produce and lay-over a keen edge, so the beginner is well advised to practise on 45 deg. at first, later steepening the bevel and noting the results.

A further peculiarity of french cutters is the radial grinding of the tools. This is illustrated in Fig. 2, and may be compared with the grinding of a square block cutter shaped to produce the same moulding as the french. A suitable abrasive wheel for grinding french cutter steel would be one of aluminium oxide—60 grit—medium grade —vitrified bond, but where heavy grinding is needed 54 grit would remove the steel more rapidly and leave a satisfactory edge for honing or filing.

Filing and burnishing

Having ground the cutter to shape and roughed out the balance end to approximately the same shape but with no bevel, it is necessary to bring up the edge to maximum keenness. Most machinists use a swiss file and a burnisher for this purpose, though some prefer a slipstone and use the burnisher only for laying over the cutting edge. Dealing with the technique of filing, the file used is a swiss No. 6 of suitable section for the particular mould. The cutter is placed horizontally in the vice with the face uppermost, as in Fig. 3, and the grinding burr removed with a half-round swiss file. Next, maintaining the grinding angle, the edge is sharpened and finally the filing burr removed.

Taking the burnisher, a slim rod of highly polished and hard steel, the face edge of the cutter is polished with firm pressure to a mirror finish, Fig. 4. Remove the cutter from the vice and replace it in an upright position, when the burnisher is used again to lay the edge over. Opinions differ but if the beginner uses his burnisher firmly at half the clearance angle as in Fig. 5 he will lay the edge over satisfactorily. The burnisher is sometimes known as the ticketer.

It is important that the burnishing is radial (Fig. 6).

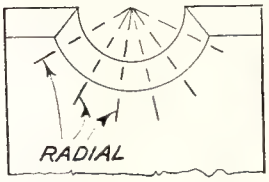


FIG. 6. HOW EDGE IS BURNISHED RADIALLY

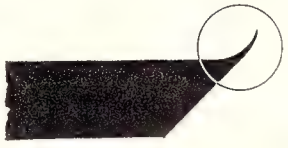


FIG. 7. ENLARGED VIEW OF CUTTING EDGE

The angle must be followed round the profile of the cutter. The danger here is that the edge may be laid over too far which will result in a heel rubbing on the timber and giving poor cutting or even causing enough friction to cause burning.

All being well the cutter is now of good quality ready for use and the evidence is always to be seen in the chips produced. A good cutter forms silky shavings and very little dust, whereas a poor cutter makes more dust than shavings and sometimes a fair volume of blue smoke.

In the next article we shall deal with more advanced cutter making, e.g., hardening and tempering, high speed steel, and abrasive timbers, and the use of cutting angle on the french spindle. (358)

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CROSSWORD SOLUTION R/62011

(*See page 144*)

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10. Pins.
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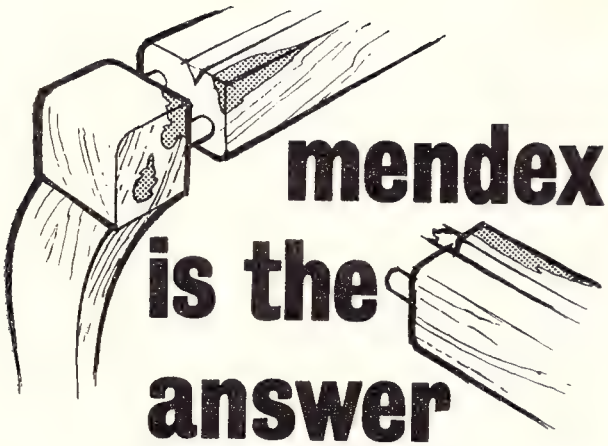
1. Pit.
2. Nail sets.
4. Mulga.
5. Don.
6. Eases.
7. Igloo.
9. Rail.
12. To Autumn.
13. Snags.
14. Fang.
15. Homes.
17. Iliad.
20. Rue.
21. Ewe.



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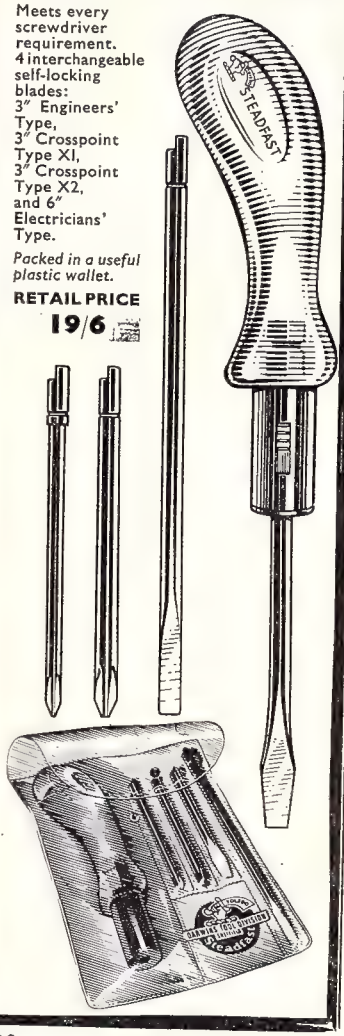

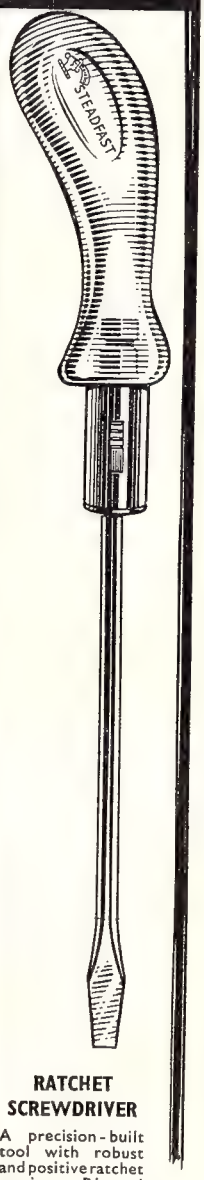

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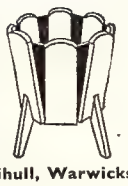

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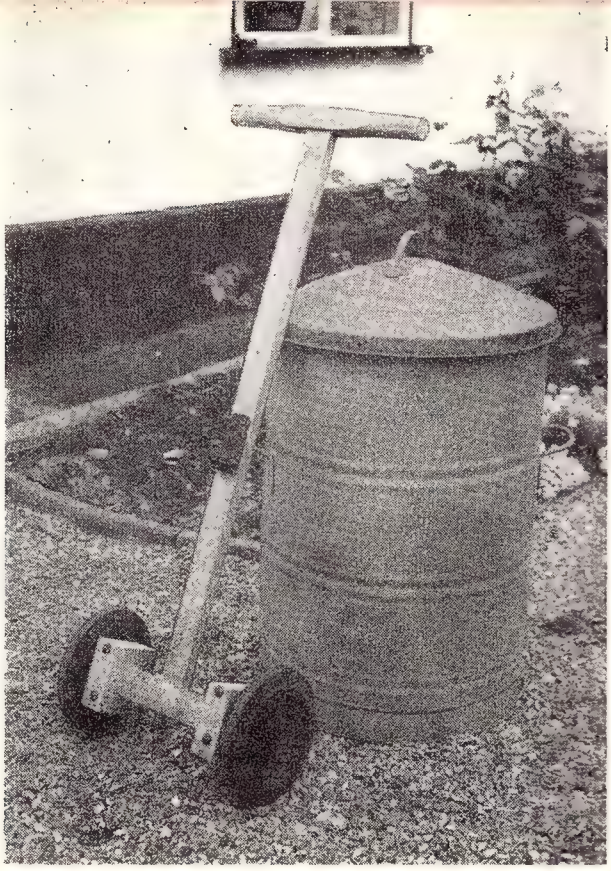


FIG. 1. A SIMPLE BUT VERY EFFECTIVE IDEA

DUSTBIN TROLLEY

by J. R. TRUSSELL, D.L.C.

The trolley described is extremely simple to make. Any strong hardwood would be suitable material.

DUSTMEN, OR REFUSE disposal operators, as they like to call themselves, are often loath to walk round to the backs of houses to collect dustbins and, in many districts, the householders have to carry their bins to the front themselves. Full dustbins are heavy articles to move and the simple trolley shown in Fig. 1. offers a mechanical means of relieving the householder of unnecessary effort. Fig. 5 shows the trolley in action. The hook on the trolley is merely slipped under one handle of the bin and the bin can then be lifted off the ground and pushed along with ease.

FIG. 2. THE TROLLEY PLACED IN POSITION TO LIFT THE BIN

Making the frame

This is composed of a shaft, handle and axle held together with wedged or pinned mortise and tenon joints using resin glue. The handle should be made 14 in. long from $1\frac{3}{8}$ in. square material and the two ends should be turned or shaped by hand as shown in Fig. 3 to make the handle comfortable to hold. The shaft and axle are of $1\frac{3}{4}$ in. by $\frac{7}{8}$ in. finished material and should measure $37\frac{1}{4}$ in. and 11 in. long respectively. These parts would best be made from a hardwood such as beech.

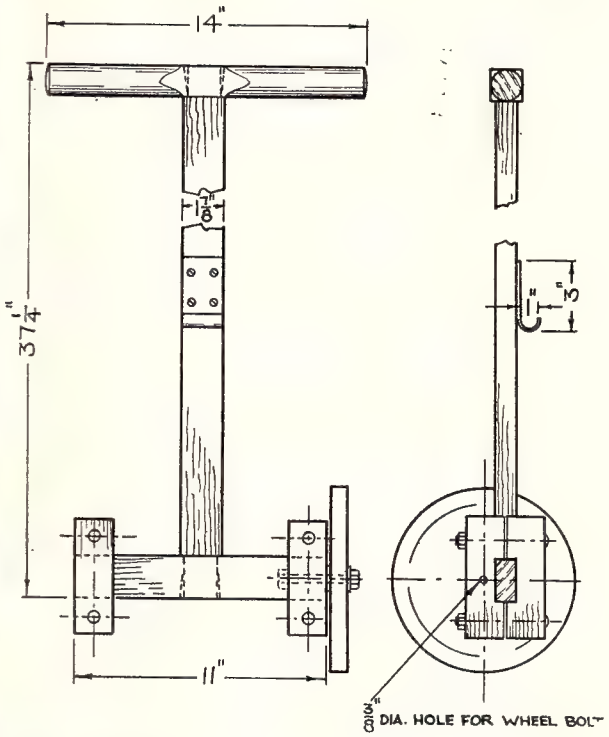


FIG. 3. FRONT AND SIDE ELEVATIONS WITH ONE WHEEL REMOVED

The axle blocks

These are each made in two parts, held together by coach bolts as shown in Fig. 4. It is suggested that each block is first made from a single piece of hardwood measuring 5 in. long by 3½ in. by 1¾ in. thick. The ⅜ in. diameter holes for the coach bolts should next be drilled in the positions shown in Fig. 4 and the mortise to receive the axle marked out. If the block is then separated into two pieces by sawing down the centre of the 3½ in. wide face before cutting the two parts of the mortise, the loss of timber caused by the saw cut will hold the two parts of the block tightly on to the axle when the coach bolts are inserted.

The wheels

Suitable rubber tyred disc wheels measuring 8 in. diam. by 1¼ in. thick with nylon bearings should be purchased.

FIG. 5. THE TROLLEY IN USE

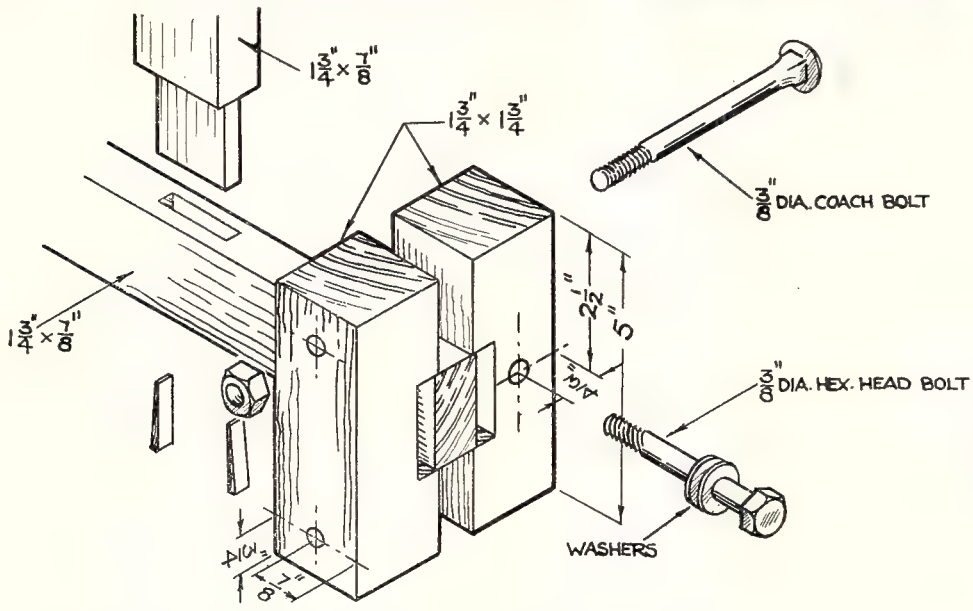


FIG. 4. EXPLODED VIEW OF COMPONENTS OF WHEEL BLOCK AND AXLE

To attach the wheels to the block ⅜ in. holes are drilled through the back half of each block in the position shown in Fig. 4 and hexagonal headed bolts are used as wheel spindles with washers inserted on each side of each wheel.

The hook

This is made from a piece of 16 s.w.g. mild steel 4 in. long by 1⅞ in. wide with one end shaped to a semicircle as shown in Fig. 3. This should be attached to the shaft with heavy gauge screws or with small coach bolts at a height suitable to raise the dustbin, for which it is being made, from the ground.

Finally the trolley should be painted to keep it weatherproof. (359-572)

Cutting List

	Long ft.	in.	*Wide* in.	*Thick* in.
1 handle	1	2½	1⅜ sq.	net.
1 shaft	3	1¾	2	⅞
1 axle		11½	2	⅞
2 axle blocks		5½	3¾	1¾

Allowances have been made to lengths and widths. Thicknesses are net.

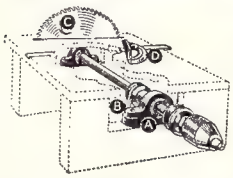
SOLID ELECTRIC PLECTRUM GUITAR

(*Continued from page* 137)

than the edges. This task calls for considerable care and the use of a very sharp plane and scraper. As the bench stop cannot be used in this case, you will need to clamp the near end of the wood firmly to the bench and work away from the clamp, turning the fingerboard round to repeat the process at the other end. When the piece has been completed it should have a regular curve from side to side and be perfectly straight along all points of the curve—that is from end to end. An uneven fingerboard can ruin an otherwise perfect instrument. The fingerboard is finally cut to 17⅜ in. long and tapered to fit the neck from the nut position, which is 13⅞ in. from the neck-body junction, D.

All the frets will have to be set at right angles to the centre-line of the fingerboard, so to allow for the taper, you will need a piece of waste wood, with an off-setting taper to use with the set-square when transferring the fret positions from your drawn scale. At this stage mark each position onto the fingerboard with a sharp-pointed scriber. (383-560)

GAMAGES



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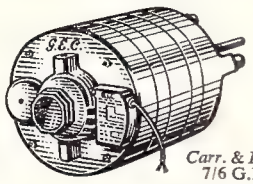

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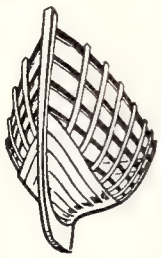

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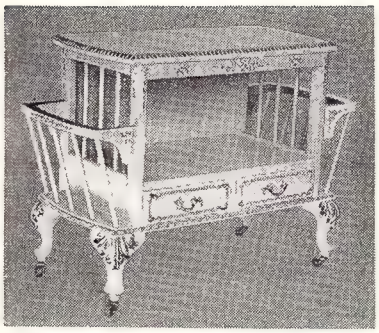

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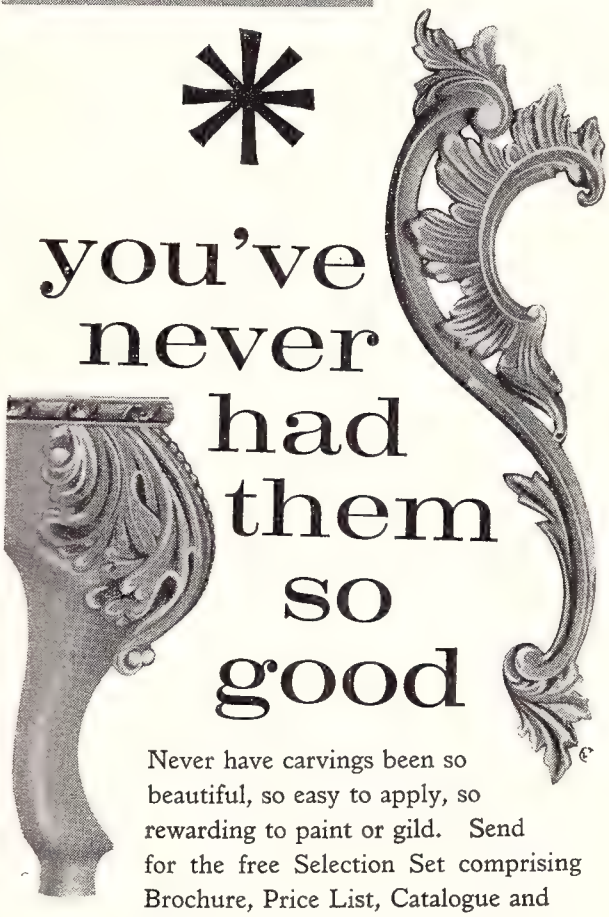

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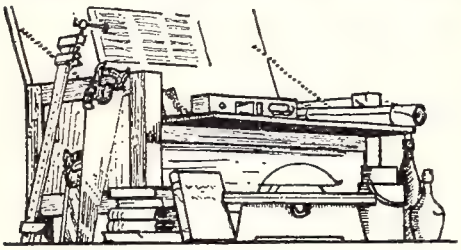
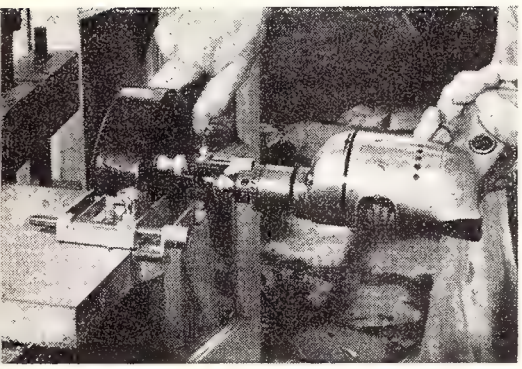
THINGS NEW THINGS INTERESTING



A monthly review of tools, fittings, machines, finishes, and materials of interest to the woodworker. Many of them are new; others may have a new application or a special interest

PORTABLE POWER SAW. *A recent addition to the range of ARCOY tools is the 4 in. portable saw. It is intended for use with an electric drill, and can be used for both ripping and cross-cutting,*



ARCOY 4IN. PORTABLE SAW

but of course it can be used equally well for rebating and grooving. The maximum projection of the saw is 1½ in. The standard saw as supplied has combination teeth, but both ripping and cross-cut saws are available. Included in the standard equipment are sets of special wobble washers which enable grooves of ⅛ in., 3/16 in., and ¼ in. to be sawn. A useful feature is that a range of moulding cutters is available, including ovolo, reeds, bead, chamfers, rounds, hollows, and double groove for sliding glass doors.

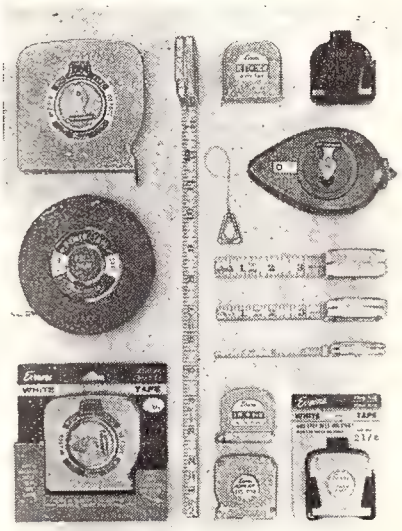
It will be seen from the photograph that an adjustable fence is fitted enabling parallel cuts to be made from an edge. Depth of cut, too, is adjustable so that grooves and rebates can be sawn. Readers who have an electric drill will find the saw invaluable, especially when it is necessary to take the saw to the wood rather than vice versa.

The tool with 4 in. combination saw and three sets of wobble washers is available through general stockists at £5.5.0. Made by Arcoy Products, Knowsley Road, Bootle, Liverpool, 20.

WOOD PRESERVATIVES. *Two interesting publications have recently been issued by Solignum Ltd. A CHART gives the range of Solignum wood preservatives, their characteristics, purpose, application, and coverage. The varieties include grades for exterior and interior work, coloured, colourless. V.D.K., wood beetle destroyers, red cedar, and water-repellent types.*

A 20-page booklet, SOLIGNUM FOR WOOD, describes the various types of preservatives, gives their uses and application, and explains how wood pests such as dry rot, wet rot, and the various beetles, should be dealt with. They are two useful publications of interest to all those who work in wood.

Both will be supplied to WOODWORKER readers free of charge by the manufacturers, Solignum Ltd., Dagenham Park, Essex.



EVANS' RANGE OF POCKET TAPES

STEEL POCKET TAPES FROM U.S.A. *This wide range of pocket tapes is now available in this country. The tapes are the product of Evans Rule Company of New Jersey, and are obtainable from tool stockists and general suppliers. Readers having difficulty in obtaining tapes should write to the distributor, L. J. Hydleman & Co. Ltd., Grove Park, London, S.E.5.*

NEW RANGE OF PLIERS. *An interesting new range of pliers is now available in the STEADFAST range. All are fully insulated and include the following:*

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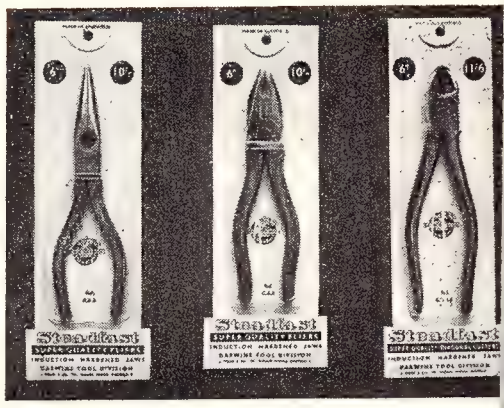

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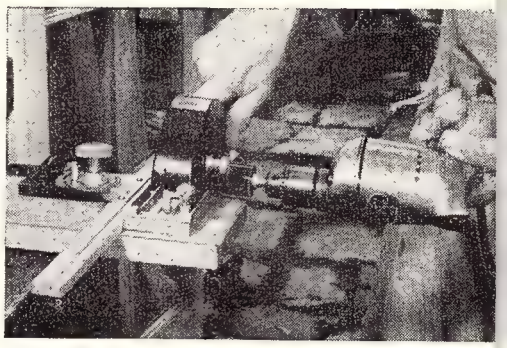
6 in. Diagonal Nippers, 11s. 6d.

All are available through tool stockists. Made by J. Stead & Co. Ltd., Manor Works, Cricket Inn Road, Sheffield, 2.

UNIVERSAL SAW GUIDE. *This device is intended primarily for use with the ARCOY 4 in. saw, but it can be used with most portable powered saws. It consists of a straight-edge or guide fixed to a clamp, the latter having a flat surface which engages with the edge of the wood. The guide is pivoted so that it can be set up to 45 deg. each side of a right angle. For quick, positive setting holes are provided to receive a peg at 90 deg. and the two 45 deg. positions, but of course it can be set at any intermediate angle. Its use enables wood to be cross-cut exactly square or at any other angle intermediate between the two 45 deg. settings. For convenience in quick and accurate setting a metal plate is provided which gives the exact point at which the fence must be fixed to make a cut in a certain position. This metal plate is four-sided, one side giving the plain off-cut position, and the others the positions for ⅛ in., 3/16 in., and ¼ in. grooves. The last three are cut with the wobble saw device. The ARCOY Saw Guide retails at 18s. 6d. and is available through tool stockists. Made by ARCOY Products, Knowsley Road, Bootle, Liverpool, 20.*



ARCOY SAW GUIDE

MARQUETRY CUTTING

15. Laying

by W. A. LINCOLN

The sequence of steps described in this article and the one last month are based upon a survey of methods used by some of the most skilled marquetry workers in Europe, backed of course by the writer's own professional experience.

GERMAN EARLY SEVENTEENTH-CENTURY MARQUETRY

It is interesting to notice the difference in character between this German work and the Spanish cabinet illustrated last month. The scenes and figures in contemporary costume are based on prints by Jost Amman of Nuremburg. The marquetry is of various woods but the cabinet stand is of a later period.
(Victoria and Albert Museum, Crown copyright)

THE MARQUETRY PICTURE is now placed carefully on the sub-veneer, or muslin, taped side uppermost. If you have worked without tapes by the butt jointed method, your face side is laid uppermost, with the toothed side down to the glue. The picture is pinned through the surplus working margin (if the borders have been omitted) or fixed with tape. If the borders have been fixed, the precise positioning is essential to see that the mitres coincide with the squared corners of the groundwork. This is done by turning the groundwork and picture over face downwards, manoevring the groundwork into the exact location on the oversized border veneers, and fixing with small glue blocks or pins.

A hot metal plate, aluminium or zinc (avoid excessive heat, as this will split and shrink the veneers) is placed on the bottom wooden caul of the press. Brush it to ensure the surface is free from dust and then lay several layers of clean paper (not newspaper which tends to imprint on the light veneers) or linoleum, on the hot plate. Or better still, a sheet of thin plastic, about $\frac{1}{8}$ in. thick. This will take up any remaining unevenness caused by the criss-crossing tapes on the face of the picture, which is why leading marquetry workers prefer to dispense with tape. The picture and groundwork are laid face downwards, with a leaf of polythene over the face of the picture to prevent it from sticking to the paper, lino or plastic.

The back of the panel is now brushed with glue, and scraped with the edge of a veneer or card to ensure smooth, even distribution. This is allowed to tack. The backing veneer is placed in position and pinned, or taped. Another sheet of polythene, linoleum or plastic, is placed over the complete assembly and the second hot plate positioned. The top wooden caul is placed on, and the press fastened down. Only moderate pressure is applied, starting from the centre bearer and working outwards systematically towards the end bearers. After a suitable period, say five or ten minutes, the re-heated surplus glue has seeped out at the edges, and the press can then be firmly tightened down. Pressure is required only to bring the two veneer surfaces into contact and flatten them, and to ensure a mechanical lock by forcing the glue into the pores.

Allow the panel to remain in the press overnight. If a centre screw press is used, it is advisable to work over the veneer assembly with a boxwood roller or electric iron set at "silk", to ensure that all air bubbles and surplus glue are squeezed out before placing in the press.

On removal of the panel from the press, the action of the glue will continue to work for several days, drawing the veneer down tightly to the groundwork and causing grain sinkage. Therefore panels must be permitted to cure, or acclimatize outside the press for 3 to 5 days. Do not attempt to level off the picture or start the finishing processes yet. All that is necessary is to examine the picture and backing for possible blisters—determined by tapping with the fingertips or lightly held pencil. A hollow sound indicates the presence of a blister, which is slitted, fresh glue inserted and relaid. Superficially clean off all excess glue on removal from the press. If the border veneers have not been laid, this can now be done. The edges are veneered first so that they are not visible from the front. The oversized backing is then trimmed down to size.

Use a marking gauge to true the picture with the groundwork and remove the surplus veneer with a chisel. The border and fillet border veneers are ironed on, and accurate mitres are cut using a mitre gauge. The assembly is then placed in the press for a further period until dry when the completed panel is laid face downwards on a clean board and the oversize border veneers trimmed down to size.

Gummed paper tapes may be removed at this stage, by wiping the tapes carefully with warm water taking care that the water does not unglue the end grain—unless, of course, waterproof adhesive has been used. After allowing a few minutes for the penetration of the moisture, the tapes peel off easily. Take care not the use a metal scraper on damp veneers or iron mould stain may discolour veneers with a high tannin content, such as oak or obeche. The veneers may be brushed with a bronze wire brush to remove glue from the upper pores and joins,

(*Continued on page* 151)

JARDINIERE

designed by E. RHODES

This plant stand is of very simple construction and would look well in a lounge or hall.

FIG. 1. PLANTS ARE AN IMPORTANT FEATURE OF CONTEMPORARY INTERIOR DECORATION

THE ORIGINAL OF this design is shown in Fig. 1 and is made with figured oak for the end pieces and American black walnut for the side boards and plugs which cover the screw heads. Any hardwood or combination of hardwoods may be used, however. An interesting feature of this design is that no joints at all are incorporated in its construction so that anyone who can plane and shape wood reasonably well can make it.

The ends

Each of these is shaped from a piece of timber trued up to 24 in. long by 10½ in. wide by ¾ in. thick. Full details of the marking out of the shape are shown in Fig. 4. Start the shaping by boring out the curve between the legs with a 1½ in. diameter expansive bit. The waste between the legs can then be cleared by sawing up the two sides with a panel saw. A panel saw could also be used for cutting the outside slopes except for the parts where the free curves are shown and, for these, a bow saw should be used.

Radius off the two top corners of each end as shown and clean up all sawn edges square and true. Finally round off all these edges, both inside and outside, as shown in Fig. 1.

The side boards

As will be seen from the sectional view in Figs. 2 and 3 these are merely trued up boards with their top edges rounded. Each should measure 28½ in. long by 9 in. wide by ⅝ in. thick.

The end boards should be prepared next for attaching these side boards by drilling four equally spaced holes for screws to attach each board as indicated in Fig. 2. If these holes are drilled $\frac{13}{16}$ in. in from the sloping edges of the ends it will allow for setting the side boards in ½ in. from the edges of the ends. Each hole should first be counterbored to a depth of ⅛ in. with a ⅜ in. Forstner bit and then drilled through with a $\frac{3}{16}$ in. drill for 1½ in. No. 8 screws and countersunk.

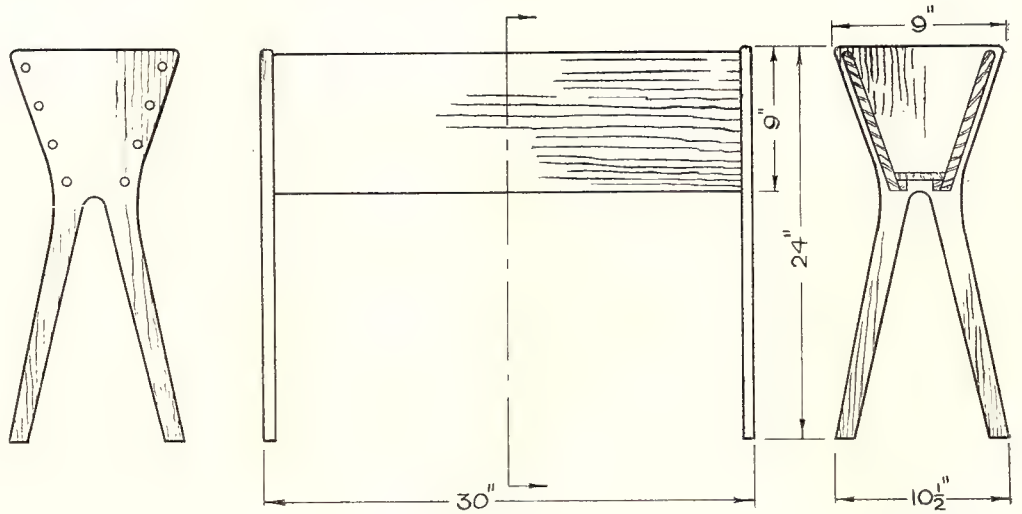


FIG. 2. END AND SIDE ELEVATIONS WITH SECTION THROUGH SIDES

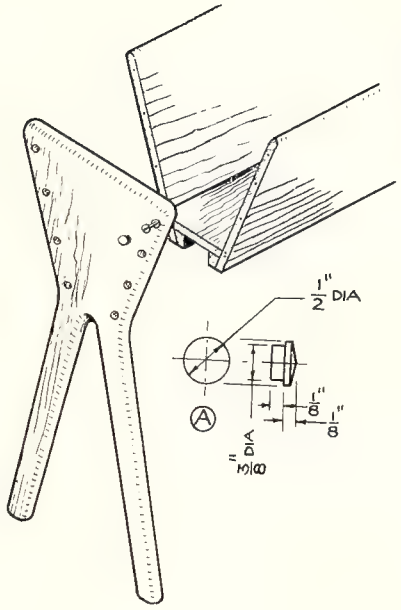


FIG. 3 (left). EXPLODED VIEW OF CONSTRUCTION AND DETAIL OF PLUGS

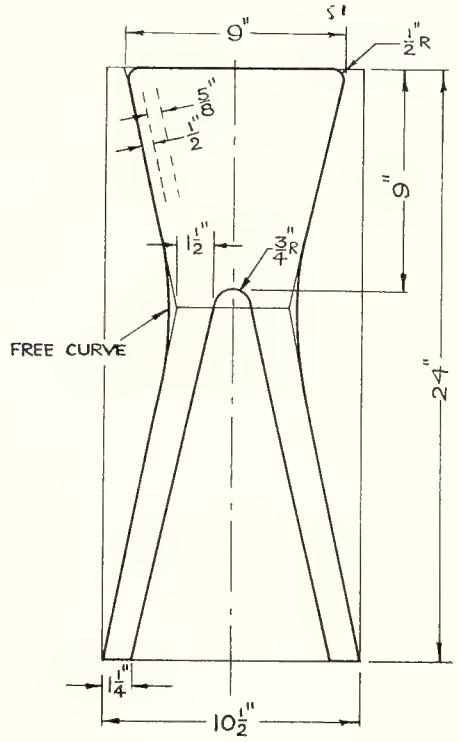


FIG. 4 (right). COMPLETE DIMENSIONS OF END

The side boards may now be temporarily cramped to the ends and some of the screws driven home. Fillets made from ⅝ in. square material should next be shaped as shown in the sectional view in Fig. 2 and glued and screwed to the side boards. The screwing will have to be done after the structure is dismantled.

The next step is to polish the ends and side boards before final assembly. When assembling glue the ends of the side boards with resin glue before driving home the screws.

The plugs

A lathe is necessary to make these. Short lengths of material about ⅜ in. diameter can be held in a self-centreing chuck and each plug turned off. Sixteen such plugs will be necessary for gluing into the counterbored screw holes.

The base board

This will need to be 28½ in. long by about 3½ in. wide by ½ in. thick. Its edges must be bevelled as shown in the sectional view in Fig. 2 and it is suggested that this board may be merely fitted tightly between sides and ends so that it may be removed for cleaning if necessary. A tight fit with this board will help to keep the structure rigid.

Some readers may prefer to make up a metal drip tray in place of this board. (382-552)

Cutting List

	Long ft.	in.	*Wide* in.	*Thick* in.
2 Ends	2	0½	10¾	¾
2 Side boards	2	5	9¼	⅝
2 Fillets	2	5	⅝ sq.	
1 Base board	2	5	3¾	½
16 Plugs from	1	0	¾	¾
16 1½ in. No. 8 gauge screws ..				

Allowances have been made to lengths and widths. Thicknesses are net.

MARQUETRY

(*Continued from page* 149)

while still damp. Stack the panel on wood blocks, with more blocks above, weighted down, allowing a free circulation of warm dry air around it. The panel may stand for up to 14 days to fully shrink, dry out and acclimatise itself to the conditions, before the levelling and polishing processes are commenced.

The majority of marquetarians do not take the care necessary for perfect results in the laying process. It is general practice to buy a sheet of plywood, regardless of type or grain direction, to apply the glue from a tube and put the picture assembly in the press with newspaper packing above it, and then tighten down. Many do not understand the importance of backing the panel with a compensating veneer. (329-429)

PRACTICAL PUPPETRY *by John Mulholland.* Quite a wide range of books already exists for those who are interested in the fascinating craft of puppet and marionette making, but this book is a welcome and useful addition.

It sets out to cover the whole subject, and does so with the aid of an author who obviously knows what he is writing about, supplemented by many excellent line drawings.

All kinds of puppets and marionettes are described, practically and completely, with details of construction, stringing, and costume. Some invaluable chapters are also included on making the theatre and scenery, lighting, and writing and producing the plays. Certainly it is a book which will become the puppeteer's vade-mecum.

With over 180 pages and an index, the book is published by Herbert Jenkins Ltd., 3 Duke of York Street, St. James's, London, S.W.1., at 21s. net.

THE QUESTION BOX

These columns are to help readers who are faced with some practical problem. Those wishing to avail themselves of this service should observe the regulations below.

Each query must be accompanied by a stamped addressed envelope.

A coupon from back page of cover must be enclosed.

Full particulars must be stated and, if possible, a rough sketch sent.

Only problems connected with woodwork can be dealt with.

Special designs for individual requirements cannot be prepared.

Queries should be addressed to The Editor, WOODWORKER, Montague House, Russell Square, London, W.C.1.

WATER-DAMAGED MARQUETRY

C.S. (Aberedw) has recently acquired a table which has suffered water damage with the result that some areas of marquetry have lifted and others been completely lost. He asks for information on the following points: 1. *From where can veneers of suitable thickness be obtained for effecting the necessary replacements?* 2. *What action should be taken regarding the partially lifted veneers?* 3. *Are impact adhesives suitable for marquetry repairs?* 4. *The composition of a black stopping for use in the ebony areas.* 5. *The best method of reviving the colours of the veneers.* 6. *The method of polishing.*

He mentions that many of the lightest veneers are sand shaded so that presumably he must avoid sandpapering or scraping the surface.

Reply: 1. If the correct thickness veneers are unobtainable, use a soft backing veneer to under-veneer first, and after sanding this down, apply normal .7 mm thickness decorative face veneers of the necessary types which are freely available. 2. Passing a scalpel knife underneath a partially lifting veneer will indicate the extent of the defect. Thin warm glue should be flooded beneath the prized up veneer and the surplus wiped off. A heated wood caul should then be placed over an inter-layer of plastic sheet or polythene or other non-stick material. Pressure by weight or cramps should be undisturbed for a minimum of 24 hours. 3. Impact adhesives are unsuitable for saw cut veneers. Many synthetic glues are not sympathetic to the original glue and the restorer would be wise to use traditional animal glues, such as Scotch glue. 4. The black composition may vary. Beeswax into which gas or vegetable black has been melted, with or without an addition of resin is perhaps the easiest to use; heel-ball, beaumontage or even glue mixed with whiting and a black powder colour, glue and charcoal—all these and possibly many other preparations have been used, such as grinding the black dust of the background veneer into a paste with glue, to match the veneer. 5. The original colour tone may have faded, but wax and grime layers can be removed with Turpentine and very fine 0000 wirewool. It is usually inadvisable to remove fully, the original polish or finish—a "new look" is not considered acceptable for an antique. 6. If the wood has been operated on for defects, and the surface conditions lacks uniformity, the careful use of a colour brush with the work placed in the position from which it is usually viewed, will tone the apparent raw spots; a few rubbers of white french polish will bring the desired degree of shine. A wax polish containing beeswax is probably the most effective protecting agent. 7. The sand-shading of marquetry will be affected by scraping; the shading will become less intense. This in itself is re-touchable, but the danger of a scraped portion becoming "alive" with hue or colour may well prove impossible to touch out. (380)

DOUBLE GLAZING

R.T. (Stretford) wants advice on double glazing the windows of his house. He asks particularly for help on the following points: 1. *The best distance between the two panes of glass.* 2. *The method of bedding-in the panes.* 3. *How to eliminate moisture which causes misting.*

Reply: For heat insulating purposes spacing of $\frac{5}{8}$ in. to $\frac{3}{4}$ in. between two sheets of glass is generally regarded as sufficient, and with this the heat loss would be about half that through single glazing.

With *in situ* windows, the risk of misting or condensation in the interspace is a difficult problem. It is too much to expect that an *in situ* seal will be perfect and the risk of condensation must be accepted. The condensation can be caused in three ways: (*a*) by the ingress of warm moist. air from the room which will form condensation on the relatively cold inner surface of the outer sheet of glass; (*b*). by the ingress of warm moist air from outside during a sudden change of temperature and humidity; (*c*) by the expiration of vapour from the glazed bedding material and from timber surrounding the glazing.

Depending on how effectively the glass can be sealed, the paint on the inside should not discolour, but may become soiled in time.

To minimise the risk of condensation, as much as possible, the double glazing should be completed when the humidity of the surrounding air is low, preferably a cold, dry day in winter. The glass should be fixed so that the sheets on one side can be removed readily for cleaning the inner surfaces. Probably the best arrangement is to have the inner sheet of glass fixed and the outer sheet removable. If the frame is in timber, the portion of frame exposed to the cavity of the wall should be sealed with a good paint and varnish or similar method, to prevent moisture from the timber gaining access to the inner space and appearing as condensation. (831)

CRAFT BOOKS

R.S. (Chichester) needs a book which contains very simple exercises in woodwork for boys of preparatory school age (9-13 years old approximately).

Reply: Given herewith is a list of books from which it is possible to make a scheme for boys of the 9 to 13 age group. It is often useful for this age group to make things in more than one material or a mixture of materials, and I have included some general craft books that cover this.

"Woodwork for the Lower Stream," by H. T. Evans. Published by The Technica Press Ltd.

"Light Woodwork", by Alderton & Bailey. Published by Edward Arnold. (This useful book may be out of print but could possibly be obtained at Foyles, Charing Cross Rd., London, or in the reference room of a library).

"Handicraft for Elementary Schools", by Moore, Hamberger & Kingzett. Published by D. C. Heath & Co., Boston, U.S.A. (Could possibly be obtained through local public library).

"The Junior Woodworker", by Charles H. Hayward. Published, price 12/6d. by Evans Brothers Ltd.

"The Book of Arts and Crafts," by M. Ickis & P. S. Esh. Published by Arco Publishers Ltd.

"Crafts for Everyone", by Newkirk & Zutter. Published by D. Van Nostrand Co. Inc. and probably obtainable at a public library. (377)

CLEANING BOXWOOD FLUTES

J.T. (Midlothian) recently bought at a sale two eighteenth-century boxwood flutes with ivory rings. He wants advice on the best method of cleaning and the sort of finish most suitable. He is replacing the defective ivory rings with white plastic ones but needs to match these for colour with the original ivory.

Reply: It will be safe to wash the flutes. You could use toilet soap and warm water with finest steel wool (No. 00). Damp the steel wool and rub firmly along the grain. Clean off with a rag damped in plain water, then with a dry rag. Repeat the treatment when the flutes are dry if you think this necessary. Follow with flour grade glasspaper and remove dust. Two thin coats of white french polish at one hour intervals, smoothed lightly next day with the steel wool used dry, and followed by a little wax, rubbing well, would complete the finish.

You could yellow the rings before waxing by turning them close to the smoke from a burning cigarette, masking the adjoining areas with something like strips of brown paper. (366)

REPLIES TO READERS' QUERIES

FINISH FOR OAK DOORS AND SQUEAKS IN STRIP FLOORING

J.G. (Eastbourne) asks (a) if we can suggest a finish for outside oak doors and window frames which will prevent loss of colour in the timber and diminish the collection of grime on the surface. (b) whether squeaks in strip oak flooring (concealed nails) can be remedied without taking up the floor.

Reply: 1. Wash down with a fairly strong solution of detergent or sugar soap; rubbing down the whole with a medium grade of steel wool or a grade of waterproof glasspaper equal to M2 of the ordinary kind. See that every part is given equal attention. Rinse well with clean water. Examine for parts missed, and bring them into line with the remainder. Rinse again twice. The resulting shade, while it is wet, will give you a good idea of what the colour will be after treatment. If it is not too dark or dirty, the colour could be enriched by staining.

Take a little of the varnish to be used (see later) and thin it with equal parts of white spirit. Add a little raw sienna in oil, and/or burnt umber in oil, until it gives the right shade when applied with a rag. Apply the stain with a brush and rub off as you go with a cloth to the desired effect. Allow two days to dry. Brush on a bare coat of best copal elastic carriage varnish. Next, rub down in water with a medium grade of carbide of silicon abrasive paper, and allow to dry. Repeat this as may be necessary. Polish with a liquid car polish. If it is not to be polished, omit rubbing down for final coat of varnish.

The squeaks in the strip oak flooring may be due to insufficient nailing; this is likely to happen if the flooring happened to have been the subject of piece-work. If this is suspected to be the cause, we can only suggest that you locate the affected strips and tusk-nail them with say 2 in. panel pins of a stout gauge; if the squeaks are due to some movement in the floorboards underneath we are afraid there is little to be done about it without involving a great deal of labour. The pin holes can be filled with suitably stained filler or plastic wood. (4)

FOUNDATION OF SHED

G.C. (Coldstream) proposes to erect a garden shed 9 ft. by 6 ft., the floor on joists with 12 in. centres and running across the shed. He asks advice on a suitable type of foundation and any other information which will be useful.

Reply: There are several answers to this problem, the one below is simple and economical. Two square blocks of concrete should be cast on the ground on which should rest the frames of the shed and also the joists of the floor.

When casting the second block make sure that both top surfaces are level. Keep openings between blocks (front and back) open to allow a good current of air to pass underneath the shed. Treat all timbers with a good preservative. If the outside of the shed is to be painted, two good lead priming coats followed by lead undercoating plus a good lead finishing coat. Joists need only be painted with a good preservative, also boards, grooves and tongues. Be sure to purchase a preservative which can be painted over. (835)

CONDENSATION WITH ASBESTOS ROOF

A.C. (Winchester) has built a combined garage and workshop, using 4½ in. thick walls with corrugated asbestos sheeting roof. He finds that in winter a great deal of condensation takes place and the asbestos roof drips water. He has never experienced this trouble with a tiled or timbered roof. He asks advice on overcoming this problem.

Reply: The reason why very little condensation is seen in timber or tiled roofs is because these materials absorb quite a lot of the moisture. Timber is also a "warm" material.

Asbestos sheets are hard and absorb very little moisture and also become very cold to the touch in winter. The condensation settles on the surface and as it builds up, drips into the space below causing damage and discomfort.

The remedy? Plenty of ventilation is the first thing that comes to mind. Lining the workshop with an insulating board is also useful, and painting the asbestos with an anti-condensation paint, too, may help. (5)

VARNISH FOR VIOLINS

G.H. (Windsor) asks advice on the varnishing of violins and violas. A violin which he made was oil varnished, a viola made by someone else was spirit varnished. In neither case was the result completely satisfactory. The spirit varnish dried much too quickly and was difficult to use, the oil varnish on the contrary took a long time to dry and collected a lot of dust. He asks if there is any objection to using clear lacquer which he has found extremely satisfactory for other jobs.

Reply: The quality of a musical instrument is largely in its design and construction, the finishing process being an enhancement which should improve the instrument with the passage of time. We are, therefore, of the opinion that, provided you have made a good instrument, it is possible that its final state could be very good when finished with a proprietary lacquer as you suggest. Certainly there should be nothing *rigidly* against the use of lacquer, as practically all the commercially made plectrum-guitars are finished with a sprayed polish.

The violin, viola, etc., however, usually have a heavier coating than the guitar as their acoustic principles are different, and there is no doubt that the proper application of oil varnish has produced the best combination of beauty and tonal quality. Oil varnish hardens by oxidation which goes on for years and its gummy nature toughens and seals the wood. Spirit varnish dries by evaporation, is more brittle, and does not have such lasting qualities.

The climatic conditions of the British Isles are not conducive to perfection in oil varnishing, which must be done in the warm, dry summer months. We believe that the final quality of oil varnish makes the waiting for the right conditions worthwhile.

If you apply the lacquer as you would the varnish, in thin coats, with regular abrasive actions between, and a final polishing with powdered pumice, tripoli or crocus powder and water, etc., it may be a satisfactory experiment. (848)

PRIMING HARDBOARD

A.M. (Newport) has been panelling some doors with hardboard. He finds that for pastel shade finishes the doors require at least four undercoats and that these must be applied very thinly or the brushmarks show. He wants to know the correct way of painting hardboard.

Reply: The difficulty you have experienced when painting hardboard is due partly to its very smooth surface but chiefly to its porosity.

The composition of many modern undercoatings adds to the trouble being notoriously short in oil content, they are not, in themselves, good primers. When such a paint, probably thinned only with white spirit, is applied direct to hardboard or other similarly porous material, the liquid content is absorbed, leaving the pigment on the surface. It is almost impossible to avoid the bristles of the brush cutting through the layer of pigment to the smooth surface, thus leaving brushmarks. The whole of the white spirit will evaporate, leaving the relatively small proportion of oil to only partly satisfy the porosity; so the problem arises again with the next coat.

A special priming is necessary. Medium-strength glue size is effective, but not recommended because in principle it is not good practice to paint over size. Two coats of french polish would do or, better still, a coat of half copal varnish and half white spirit.

Either of the above-mentioned methods will enable you to paint your panels without leaving brushmarks. After distributing the paint evenly it should be crossed, re-crossed and laid-off downwards, each time gradually lessening the pressure on the brush until finally only the tips of the brush are touching, and without bending the bristles. Laying-off should be done like an aeroplane landing or taking off. (443)

REPLIES TO READERS' QUERIES

BLEACHING PARANA PINE

C.P. (Edinburgh) is making a knitting machine table of parana pine with red beech legs, the latter to be polished black. He asks if it is possible to bleach the pine and if so the method to adopt.

Reply: Parana pine can be bleached. One treatment is enough except on the pink streaks which are often present. These areas require several treatments. An agent such as "Domestos" is suitable. Wash the surface with water when bleaching is complete.

However, we advise you not to use bleach. Parana pine is not of sufficiently good quality to be used as a medium for the bleached finish. We should use a mahogany finish. Damp the surface and when dry, paper flat. Simmer a teaspoonful of bismarck brown in a pint of water for a few minutes and, when cool, apply quickly and evenly. Next day stain with the bismarck this time dissolved, a ½ teaspoonful to a gill of meth., and with a dessertspoonful of polish mixed in. An hour later brush on two coats of white polish containing 10% of the spirit stain. Next day flat lightly with fine steel wool after which the job is ready for the rubber. Use the polish slightly tinted with the bismarc stain. (364)

TABLE MATS

G.C. (Northampton) has a set of coloured illustrations done by what seems to be the offset-litho process. He aims to make table mats of them by sticking the prints on to hardboard with a cork backing. He asks advice on the method of doing this, also a heat-proof finish for the surface.

Reply: The pictures on the table mats we have seen are actually transfers. The picture is on an adhesive film, usually gum, and the protective paper is peeled off on application. The finish is cellulose transfer lacquer of either spraying or brushing type.

The difficulty with paper is that it will absorb some of the lacquer with consequent staining or discolouration depending on the quality of the paper. Therefore the prints will need to be sized before being lacquered. You need to experiment with one and if satisfactory there should be no subsequent difficulty.

You should glue the cork first. Any impact adhesive will be suitable. Gloy or white paste will do for the paper. Apply a good even coat, wait a minute or two to let the paper stretch, then lay on the hardboard smoothing out from the middle in all directions. The mats should be dried under some pressure to prevent any tendency to warp. If they do warp then a layer of paper will need to be glued on to the back of the hardboard before the cork is glued on, but this will not be necessary if an impact adhesive is used.

An alternative method of laying prints on thin sheets such as hardboard is known as the dry mounting method. This requires a heated press and a sheet of dry mounting tissue which is put between the photograph or print and the hardboard. When put into the press the heat and pressure lay the paper perfectly flat. This method has the great advantage that it does not employ any sort of liquid and so does not warp the hardboard. Similarly, varnish films can be obtained in sheet form and put over the top of the picture in the press and this gives a high gloss finish.

Such dry mounting presses are rather expensive. It might be possible for you to get a photographer with the necessary equipment to do the laying for you. (367)

FRENCH POLISH FOR SALAD BOWLS AND DEFINITION OF GLAZE

J. R. (Edinburgh) asks if french polish is a suitable finish for wooden salad bowls. Also what is meant by glaze when applied to varn'sh.

Reply: Trade quality french polish, preferably white, is a suitable finish for wooden salad bowls. The finish should be full grain. We recommend that the bowl be cleaned occasionally by wiping over with a fine rag and a trace of olive oil. This will keep the varnish film in good condition and impart a suitable aroma to the bowl. Washing should not be necessary. However, if it has to be done, use a mild soap, rinse under a cool tap, dry off, and rub over with a very small amount of the oil.

Glaze is a type of varnish which hardens quickly giving a very thin bright film. Usually it is made from gum benzoin dissolved in spirit. It is essential to use top quality gum only. This is crushed, put into a screw top jar with the spirit, and stored in a warm place for about a week. It should be shaken occasionally. When finally settled the waste will be at the bottom with the glaze on top. This is decanted—poured off gently without disturbing the waste—and is then ready for use.

Suitable recipes are: 5 gills meth. 5 oz. gum benzoin and 1 oz. gum mastic; or 7 oz. gum benzoin to 5 gills of meth. (455)

BONDING WOOD TO FIBREGLASS

W.V. (Henley) has come up against the problem of bonding wood to fibreglass. He has tried various glues with not much success and asks for advice on the problem.

Reply: Unfortunately you do not say if you are concerned with bonding glass fibre in mat, rovings or made up polyester-fibreglass in the composite form, also the area to be covered would have been most helpful to advise on the best method of purchasing the adhesive.

One of the best adhesives to use is one from the wide Epoxy range. For small quantity use, buy one of the familiar two-tube packs marketed everywhere as *Araldite*. Make up a solution of equal parts of blue tube to black tube. Mix well together and then add an equal quantity by volume (not critical) of *Trilene*, the trichlorethelene put up in small packs by Messrs. I.C.I. Ltd., for use as an anaesthetic, and sold by chemists.

It will be found that mixing the epoxy to the Trilene demands vigorous beating to break down the viscous body to an easy flowing liquid, which latter makes for easy working.

With the mixed solution, coat the wood with a very thin spread, something of the order of 5 thousandths of an inch and then the surface of the polyester sheet, or in the case of mat or roving, there would have to be "flooded" dabbing with a short bristled brush. Leave as an open assembly for 20 minutes to allow the Trilene to evaporate away, then bring the two mediums together under light pressure and leave for 36 hours, full strength will be gained after 7 days.

A small rubber print roller will be found an excellent method of spreading the adhesive on flat surfaces.

The adhesive, whilst expensive, is very economical in use, coverage being up to 150 sq. ft. to the pound weight, the ultimate bonding result having enormous strength.

Tools, brushes, etc., can be cleaned immediately after use with cellulose thinners. (674)

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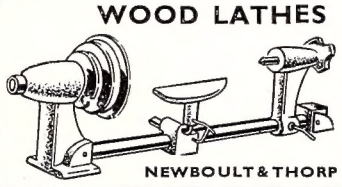

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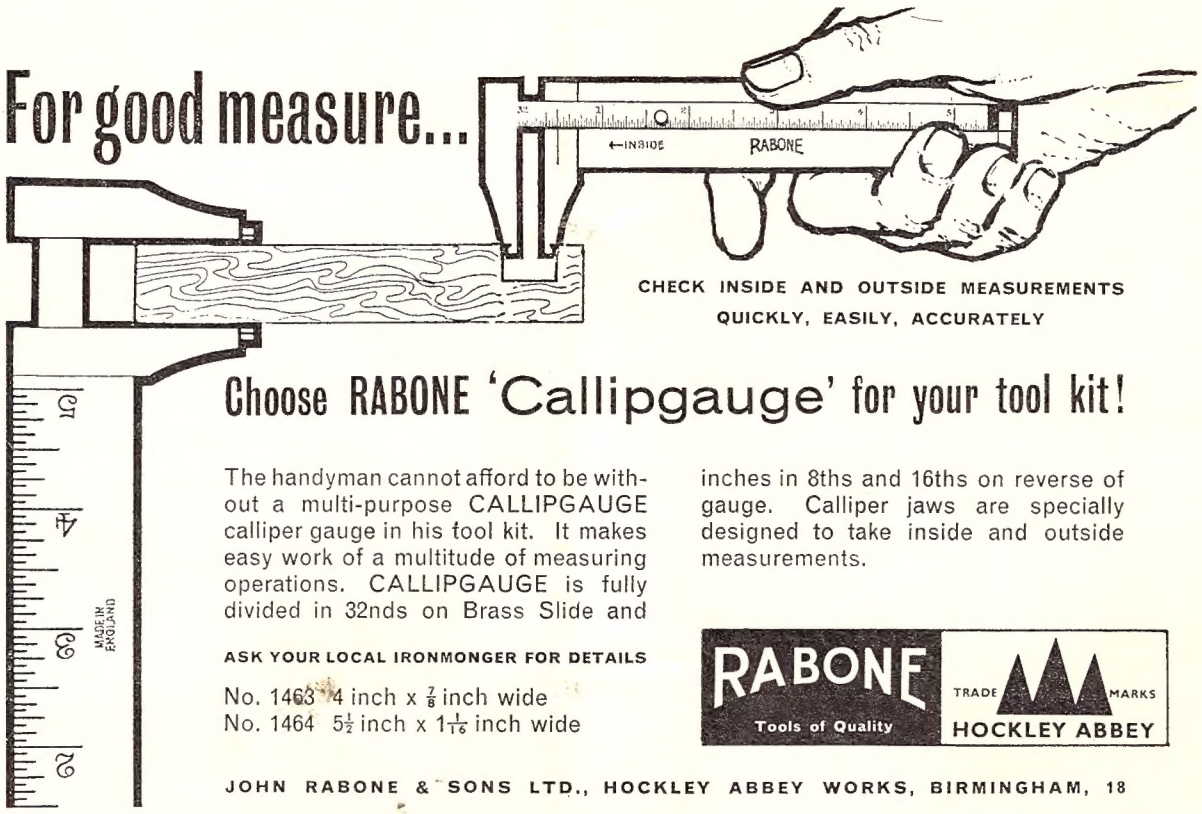

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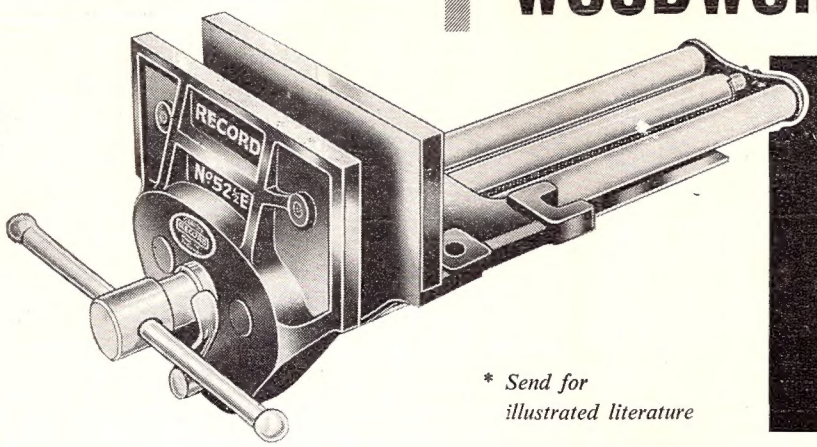

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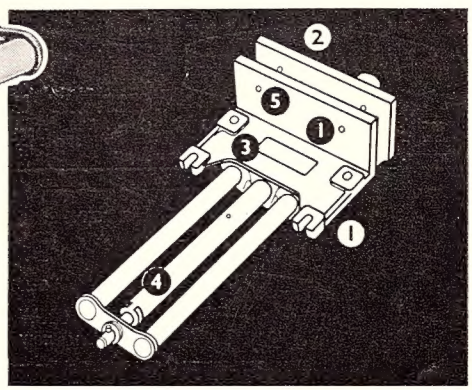

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